August 16, 1943

STEEL

The Magazine of Metalworking and Metalproducing

ESTABLISHED 1882

TECHNOLOGY DEPT.

HIGH QUALITY IS GEARED TO INTRICATE WAR PARTS WITH

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AUG 16 1943
DETROIT

Thomas Strip

COLD ROLLED STRIP STEEL

1 SPECIFICATION ACCURACY 2 UNIFORM GAUGE, TEMPER, FINISH

3 DEPENDABLE DUPLICATION

BRIGHT FINISH NOT COATED, SOLDER COATED, ELECTRO-COATED WITH NICKEL, ZINC, COPPER, BRASS

SPECIALIZED PRODUCERS OF COLD ROLLED STRIP STEEL

THE THOMAS STEEL CO. • WARREN, OHIO

PRECISION TURNING - FACIN
GROOVING ALUMINUM C
HEADS WITH HEALD BORE-

Borizing Points the Way to Post War Precision Finishing of Light Metals

BORIZED ALUMINUM AND MAGNESIUM AIRCRAFT PARTS

★

Adapter Assemblies
Bases
Bearing and Pump Casings
Bearing Housings
Bearing Supports
Boost Control Housings
Camshaft Brackets
Camshaft Housings
Caps
Carburetor Bodies
Carburetor Main Bodies
Clutch Selector Housings
Covers
Cylinders
Cylinder Heads
Cylinder Mufts
Crankcase Assemblies
Crankcase Sections
Crankcase Blower Sections
Crankcase Front Sections
Crankcase Center Sections
Crankcase Covers
Crankcase Rear Covers
Intermediate Crankcases
Intermediate Rear Crankcases
Lower Half Crankcases
Rear Crankcases
Crankcase Bearing Caps
Crankpin Oil Plugs
Crankshaft Oil Plugs
Drive Shaft Supports
Front Bearing Caps
Front Covers
Fuel Pump Bodies
Fuel Pump Drive Shafts
Gear Boxes
Gear Cases

Generator End
Gun Turret Gim
Gun Turret Sad
Gyro Pilot Pump
Gyro Pilot Servo
Housings
Hydraulic Cylind
Instrument End
Magneto Adapte
Magneto Gear H
Magneto Housin
Motor End Shie
Oil Pumps
Oil Pump Bodie
Oil Pump Cover
Oil Pump Scave
Pistons
Plates
Pump Housings
Propeller Dome
Propeller Shaft
Propeller Shaft
Rear Cam Suppo
Rear Reduction
Reduction Drive
Reduction Gear
Regulator Cover
Regulator Housi
Selsyn Motor Pi
Shock Absorber
Speed Reducer
Supercharger Ba
Supercharger Fr
Supercharger Ga
Supercharger Ri
Supercharger Re
Valve Brackets
Valve Housings
Valve Guides
Valve Tappet Gu
Volute Casings
Water Pump Ca
Wheelcases

What can be accomplished with light metals such as aluminum and magnesium, and indicative of what will be done with these alloys in post-war manufacturing, has already been shown by the aircraft industry. Approximately 40 per cent of the aircraft engine is comprised of light metals, and largely because of this it has been possible to reduce the horsepower-weight ratio to 1 lb. per horsepower.

Just as valuable as the aircraft industry's lesson to the post-war world on the use of light metals are the lessons to be learned from their methods and practices in machining aluminum and magnesium. Their methods of finishing parts made of these metals deserves particular attention. Study of their processes reveals the outstanding fact that *borizing*, or precision boring, turning facing, and grooving with cemented carbide or diamond tools, is used almost exclusively for precision finishing of aluminum and magnesium. The partial list of aircraft parts given herewith is eloquent testimony of this—all of them are made of either aluminum or magnesium and all of them are *borized*.

For More Precision, FASTER

bring your problems to

The HEALD MACHINE CO., Worcester, Mass.

TECHNOLOGY DEPT.

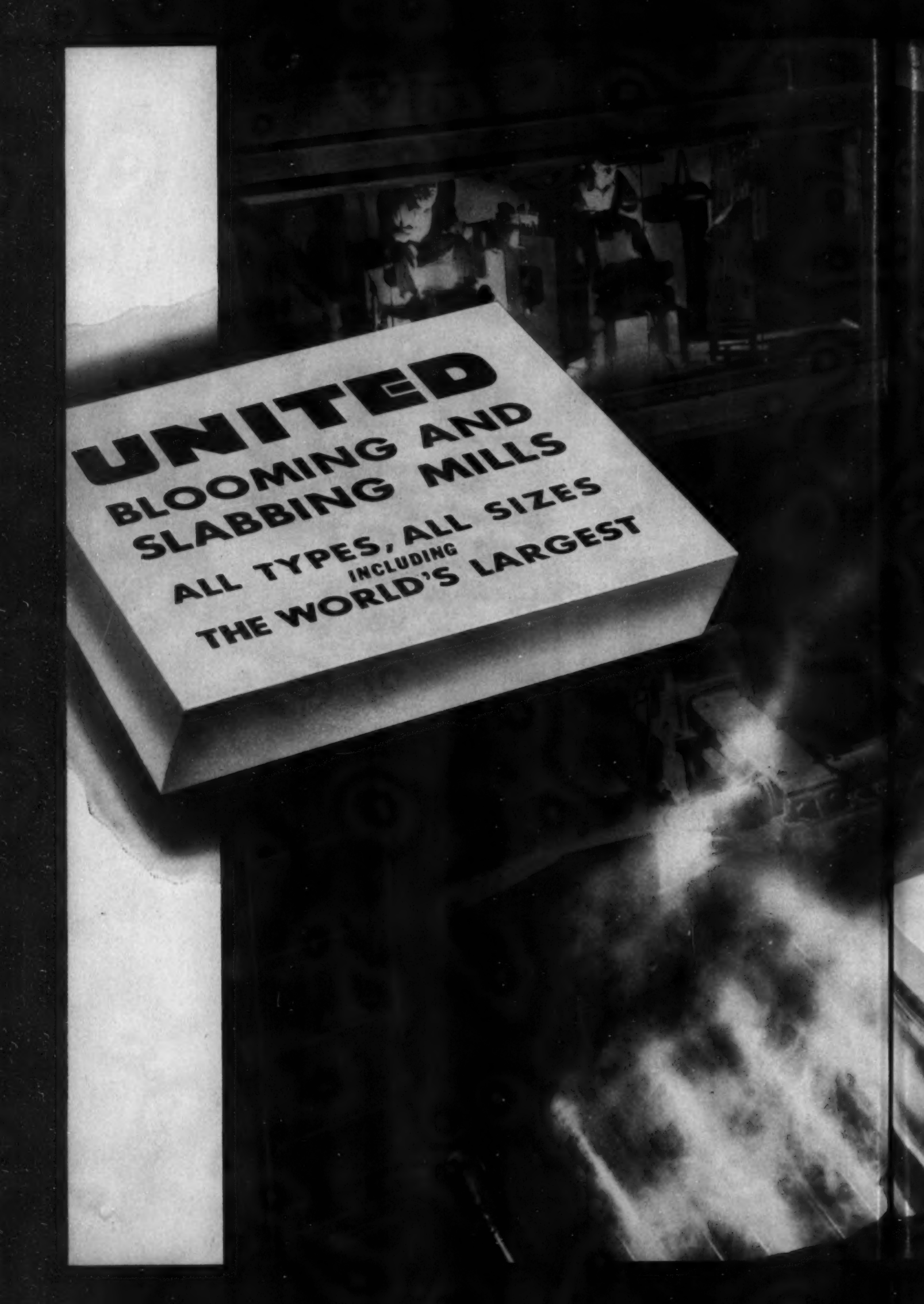
Convoy builder

This coil of Bethlehem welding wire may not make the headlines along with those efficient U-boat killers, the destroyer-escort and the corvette. But it is one of the basic reasons why America is finally going to win the battle of supply—the basic struggle upon which our war efforts on all fronts depend.

Everybody who reads the papers knows that American shipbuilders are producing all kinds of ships at unheard-of speed. This is effected largely by use of subassemblies and new welding techniques, opening up undreamt-of possibilities in the rapid assembling of ships to supply our fighting fronts.

Every month, Bethlehem Steel Company is producing many thousands of tons of welding-quality wire and rods in coils. Processors are turning these products into the finished electrodes which are helping the nation's humming shipyards in their swift building of cargo carriers, as well as warships of every type.

★ ★ ★ BETHLEHEM STEEL ★ ★ ★


UNITED
BLOOMING AND
SLABBING MILLS
ALL TYPES, ALL SIZES
INCLUDING
THE WORLD'S LARGEST

UNITED ENGINEERING *and* FOUNDRY COMPANY

Pittsburgh, Pennsylvania, U·S·A

BEHIND THE SCENES

Production with a Capital "P"

■ One of the most amazing stories of production we've heard is that of the St. Louis Ordnance Plant where the first employe was hired on January 7, 1941 and the first lot of ammunition accepted by the government on December 8, the day after Pearl Harbor.

Since then, more than *two billion* rifle and machine gun cartridges have been produced and each cartridge undergoes more than two hundred operations and more than 90 tests and inspections. Now for the "enough to" statistics.

That is enough to girdle the globe nine times at the equator, with side trips to Tokyo and Berlin; and if placed end-to-end (we always love this one) in a single line, the .30 and .50 caliber cartridges would stretch to the moon!

Hats off to the Western Cartridge Co. and its subsidiary, the United States Cartridge Co. which operates the plant.

More Statistics

■ Loving figures like that and also being in the throes of painting our house, an item on painting the Brooklyn Bridge caught our eye the other day. It said—quote—that two men, applying paint at a normal rate and working 365 days a year, would spend their entire adult lives giving the bridge two coats—unquote. That, we claim, would get to be a very monotonous adult life.

High Wind Coming

■ Westinghouse has started construction of two 20,000-horsepower electric motors for the Army's new stratosphere wind tunnel at Wright Field. They will produce a sub-zero hurricane of more than 600 miles an hour to test the high altitude performance of faster and more deadly fighting planes of the future.

So massive is the 33-ton rotor of the motors, that if left at rest for several days, it would squeeze the film of oil out of the space between the motor shaft and the bearings supporting it. When this happens, a pumping system will force oil into this space, actually lifting the rotor several thousands of an inch, so it will not rub directly on the bearing.

Pittsburgh Dilemma

■ Walt Campbell, capable associate editor on news and markets, is still a little bewildered from his first night in Pittsburgh a couple of weeks ago when he went down to pinch hit during Pittsburgh editor Bob Hartford's vacation.

Taking the evening train down, Walt arrived at the station to find a terrific downpour and no cabs, so he puddle-jumped across the street and hopped a trolley headed toward his hotel. It was still coming down in buckets as Walt got off a couple of blocks from the hotel and after huddling in a doorway for awhile decided he was wet enough that he might as well plunge right in, so he practically swam the two blocks and checked in.

Once in his room, Walt got out of his wet clothes as fast as possible and settled into a nice hot tub. But immediately horns begin to toot, whistles blow, fire engines race up and down the street and off go all the lights. Of course, out here in Ohio we know about these things for weeks in advance so Walt figured the only possibility was that the hotel had been struck by lightning and out of the tub he stumbled to try in vain to lay his hands on a towel. By knocking over a lamp and stubbing his toe he did manage to find his clothes and a book of matches but of course they were too wet to light. So there Walt sat until the blackout was over—a very, very unhappy editor.

Quick Change

■ That story reminds us of that famous crack by Bob Benchley, when he, in similar circumstances, had been drenched to the skin and upon finally getting in out of the rain, said: *"Oh boy, now to get out of these wet clothes and into a dry Martini!"*

The Man Who Wouldn't Advertise

■ Peter Fairfax Meyer of the War Production Training Staff of LaSalle Extension University says he wouldn't deign to call this verse a poem; nor would he dare to call it humorous, although he can furnish authenticated affidavits that a half-dozen of the frozen-puss gentlemen of the LaSalle faculty actually smiled upon reading it, without being tickled in the ribs. And with that introduction, here it is, although we're afraid that when the advertising dept. boys see this they'll think their present sales approach is pretty thin.

(*With Apologies to Edward Everett Hale*)

Breathes there a man with soul so dead,
Who never to himself hath said:
"My trade of late is getting bad—
I'll try another full-page ad?"

If such there be, go mark him well.
For him, no bank account shall swell!
No angels watch the golden stair
To welcome home a millionaire.

The man who never asks for trade
By column, page or inch displayed,
Cares more for rest than worldly gain
And patronage but gives him pain.

Tread lightly, friends, let no rude sound
Disturb his solitude profound.
Here let him live in calm repose,
Unsought, except by men he owes.

When this man dies, go plant him deep,
So naught may break his dreamless sleep;
Wherein no clamor may dispel
The quiet that he loved so well.

So that the world may know its loss,
Place on his grave a wreath of moss
And, on a slab above—"Here Lies
A Fool Who Would Not Advertise."

Vol. 113, No. 7. August 16, 1943. Issue of STEEL, published every Monday at Cleveland, Ohio. Entered as second class matter at the post office, Cleveland, O., under act of March 3, 1879. U. S. and possessions, Canada, Mexico, Cuba, Central and South America, 1 year $6; 2 years $10; all other countries, 1 year $12. Current issues, 25c. Yearbook of Industry issue, $2.00.

Editorial Contents—Page 49

Making planes **FLY** *with their feet on the* **FLOOR**

Not so long ago, the only way to check the operation of an airplane was to test it in flight. If it had to be done at the risk of a pilot's neck — well, in *those* days, what were test pilots for, anyway?

HydrOILics has changed that!

For example, the HydrOILic Test Stand pictured here checks the whole hydraulic system of an airplane — *while the plane is safe on solid ground.* It's a mighty important test, because ailerons, rudders, elevators, bomb bay doors, landing gear, and even the propeller pitch controls of modern aircraft depend on the plane's hydraulic system for safe, smooth, accurate operation. Other HydrOILic test stands check other phases of airplane performance on the ground, for safety in the air.

Aviation is only one of many fields in which Denison Engineers have applied the exceptional *smoothness, flexibility and controllability* of oil hydraulic power. If you have a problem — in either your product or your production — our engineers will be glad to hear from you.

The Denison Engineering Company, 1163 Dublin Rd, Columbus, Ohio.

SOMEONE YOU KNOW . . .

Chances are, you'll *never* see one of these testing units. But *someone you know — your own son, perhaps* — may be among the thousands of air force heroes who owe much of their daily safety to its service.

INDUSTRY'S NEW RIGHT HAND FOR AVIATION

DENISON EQUIPMENT *in* APPLIED Hydr OILics

Aircraft Bolts by Cleveland

AN Hex Head Bolts with drilled heads or drilled shanks produced by the Kaufman Process, which is well adapted to manufacturing parts to Army and Navy specifications—the same high quality you've learned to expect in our regular line of cap and set screws.

Write for data.

THE CLEVELAND CAP SCREW COMPANY
2917 East 79th Street • Cleveland 4, Ohio

Cleveland Cap Screws

Set Screws and Special Upset Parts

Made by the Originators of the Kaufman Process for Greater Strength and Accuracy

Specialists for 26 years in Headed and Threaded Products

WAREHOUSES

CHICAGO: 726 W. Washington Blvd.	**HAY**market	**1392**
PHILADELPHIA: 12th & Olive Sts.	**POP**lar	**7530**
NEW YORK: 47 Murray St.	**BA**rclay	**7-5088**
LOS ANGELES: 1015 E. 16th St.	**PR**ospect	**8326**

"HOW IS POR-OS-WAY DOING ON HIGH-SPEED STEEL CUTTERS?"

Dear Charlie:
You wanted to know how Por-os-way's doing on high-speed steel cutters. So here goes from the [redacted] plant. These cutters are for finning airplane cylinder barrels. Production is up 66 2/3%. no more burning and no rejects. The boys are sure fussy about their work and sold on Por-os-way. Can you blame 'em?
Your roving reporter,
"Vic"
READ THIS, WRITES
POR-OS-WAY'S
WAR PLANT REPORTER

THE JOB:
Grinding sets of Huther high-speed steel cutters for finning airplane cylinder barrels on a universal tool and cutter grinder.

THE WHEEL: Por-os-way 7"x½"x1¼" 9A60HV2.

All facts and figures given are taken from an actual field survey made by a Por-os-way correspondent.

THE RECORD	POR-OS-WAY WHEEL	FORMER WHEEL
Production per man per hour	5 sets (20 pcs.)	3 sets (12 pcs.)
Pieces per dressing	8 to 12	3
Wheel life	8 hours	6 hours
Stock to be removed	.010"—.018"	Same
Depth of cut per pass	.003"	.001"
Rejects	None	0.5 to 1%
Operations eliminated	Cutting shoulder	
Production Increase	66⅔%	
Remarks: Former wheel burned work. Por-os-way grinds cool, holds corner.		

Write for complete booklet "Facts About Por-os-way". The address is 436 Wheatland Street, Phoenixville, Pennsylvania.

2 TO 5 TIMES MORE WAR PRODUCTION PER MAN PER MACHINE

POR-OS-WAY* *a new* RADIAC* PRODUCT

A. P. DE SANNO & SON, INC.
NEW YORK, CHICAGO, PITTSBURGH, CLEVELAND, DETROIT, LOS ANGELES

PHOENIXVILLE, PENNA.
Western Gateway to VALLEY FORGE

*T. M. Reg. U. S. Pat. Off.

COPYRIGHT, 1943, A. P. de Sanno & Son, Inc.

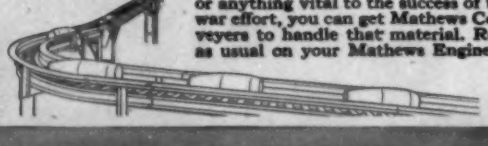
Behind our Men behind the Guns

BACK UP FIGHTING COURAGE with the deadliest guns, bombs, tanks and planes, and you've got America's formula for victory.

There's no surer way to shorten the war . . . no surer way to save the lives of our fighting men . . . no surer way to save our American way of life.

Speeding up assembly . . . removing production bottlenecks . . . preventing hitches in the speeding movement of vital war materials is Mathews' contribution to America's war effort.

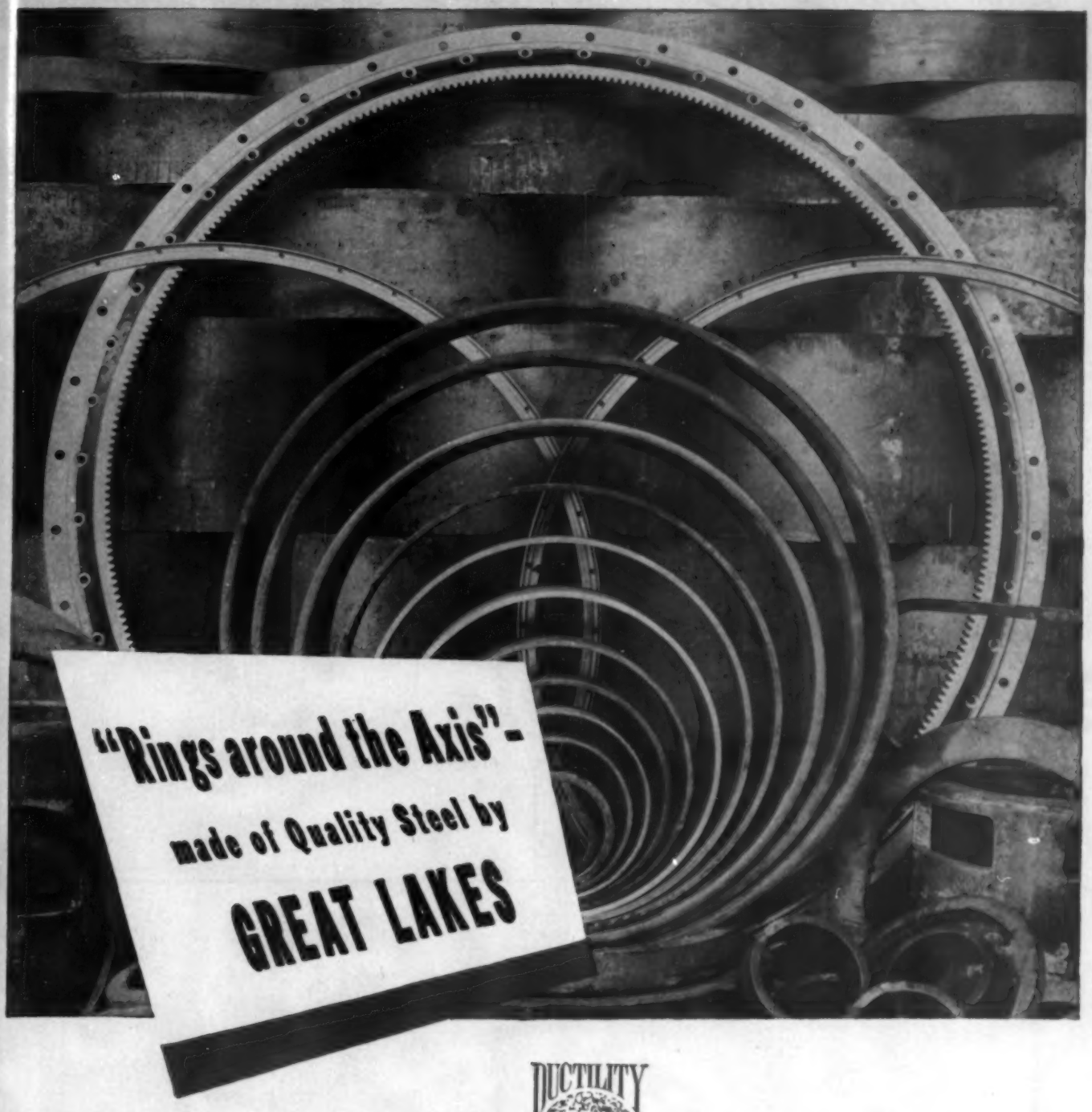
If you are manufacturing war material, or anything vital to the success of the war effort, you can get Mathews Conveyers to handle that material. Rely as usual on your Mathews Engineer.



MATHEWS CONVEYERS FOR MECHANIZED PRODUCTION

MATHEWS CONVEYER COMPANY

ELLWOOD CITY
PENNSYLVANIA



The welded rings shown here are manufactured by the American Welding and Manufacturing Company, Warren, Ohio, from sections and bars of N-A-X Alloy Steel, produced by Great Lakes Steel Corporation.

This application is one of hundreds today in which the unusual properties of N-A-X 9100 Series Alloy Steel are being utilized in the production of ordnance equipment, where standards are high and specifications exacting.

If you have need for a High Tensile steel—or a carburizing steel—or a medium and deep hardening steel—it will pay you to investigate the properties of N-A-X 9100 Series of Alloy Steels.

DUCTILITY
STRENGTH

Send for your copy of a new booklet describing these steels. It's yours for the asking.

GREAT LAKES STEEL CORPORATION
Detroit, Michigan
Sales Offices in Principal Cities

Division of
NATIONAL STEEL CORPORATION
Executive Offices · Pittsburgh, Pa.

***Yesterday**—Only true pioneers and thrill seekers would ride in the rickety "egg crate" plane. Yet that plane, with all its crudities, was a giant step in human progress and transportation. Without early abrading, processes such as grinding, it would have been impossible.*

***Today**—The giant air liner is a tremendous improvement on the plane of yesterday—as is the modern fighter or bomber over the planes of World War I. HONING—the advanced abrading process—helped to make this improvement possible. Safety, lightness, long operation without overhaul—all are dependent to some degree on HONING.*

***Tomorrow**—We do not know what course the progress of air transport will take. But whatever it is, there will be greater need for better controlled machining processes.*

Micromatic has developed the HONE ABRADING process to be ready for these advanced requirements. At present, HONING application is limited to serious war needs. Tomorrow, it can expand with many new applications already developed.

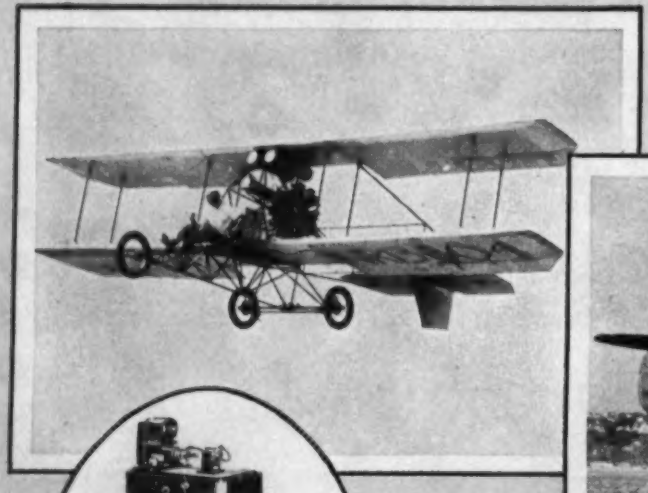
HONING

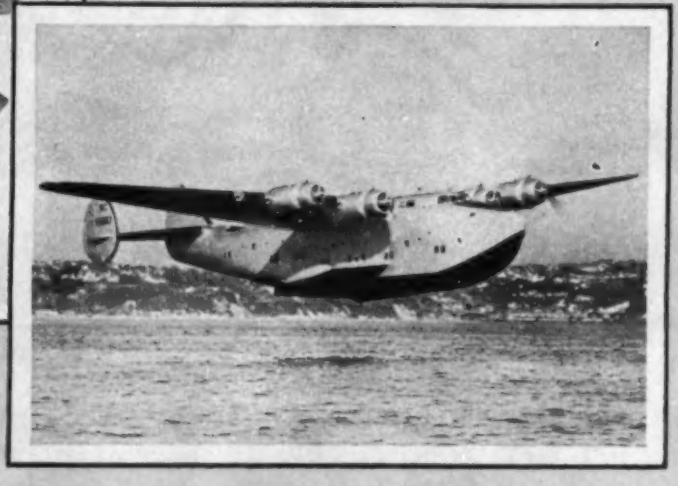
helped to develop yesterday's

"EGG CRATE" Plane

into the

SAFE, MODERN AIR TRANSPORT





Micromatic HONE CORPORATION

Detroit, Michigan

MAKERS OF HONING MACHINE TOOLS

HONING helped create "400" Aviation

The tactical need for outflying our enemy has crowded military aviation into the "400" bracket, as may be seen in the comparison below:

	WORLD WAR I	WORLD WAR II
Speed	130 MPH	400 MPH
Period Between Engine Overhauls	40 Hours	400 Hours
Tactical Ceiling	12,000 Feet	40,000 Feet
Engine HP	125 HP (Liberty)	2,000 HP

This amazing advancement has been accomplished largely by better engineering design, better metallurgy and better controlled machining. Microhoning provides one of the most important machining controls by assuring maximum quality and safety in the bearing surfaces of our military and naval plane engines and other plane mechanisms.

Bearing bores and other critical surfaces are finished by Microhoning—the modern abrading process which removes stock at rates up to 65 cubic inches per hour, generates accuracy for roundness and straightness of bore within .0002″ to .0003″ and any desired surface finish.

Better planes for war mean better planes for the peace to come.

Some Microhoned Aircraft Bores

Engine Cylinder Barrels
Master Con Rod (all bores)
Articulated Rod (all bores)
Piston Pin Bores
Valve Guide Bores
Pinion Gear Bores
Oleo Cylinder Bores
Brake Cylinder Bores
Gun Turret Hydraulic Cylinder Bores and many other parts

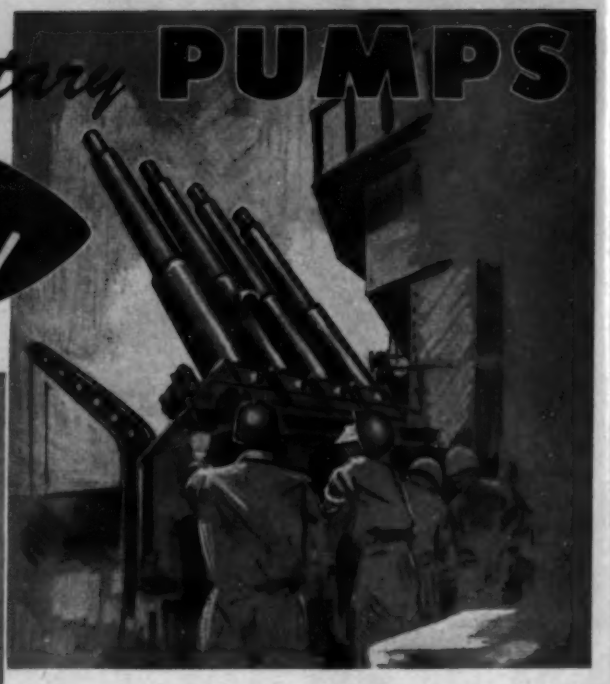
MICRO MATIC

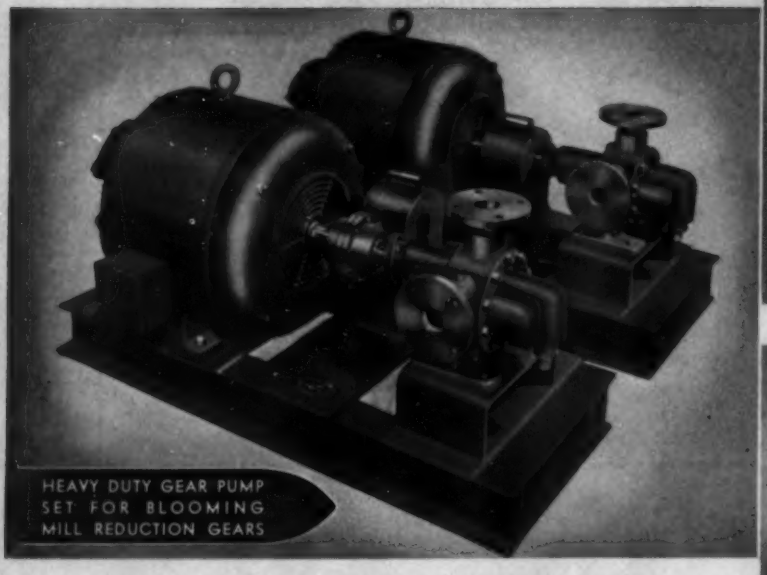
MICROMATIC HONE CORPORATION

DETROIT, MICHIGAN

How ROPER Rotary PUMPS

Are Speeding Imporant War Jobs!





HEAVY DUTY GEAR PUMP SET FOR BLOOMING MILL REDUCTION GEARS

HYDRAULIC GEAR PUMPS USED IN BOMB SPINNING

The Preference of Steel Mill Engineers

Roper Rotary Pumps . . . hydraulically balanced . . . are preferred for steel mill operations because they make a husky job look easy, and because they have the intestinal fortitude to last a long time. When installed with space-saving direct drives, Ropers become integral parts of the machinery they service.

With only 2 moving parts they require less attention and deliver the maximum of mechanical and volumetric efficiency.

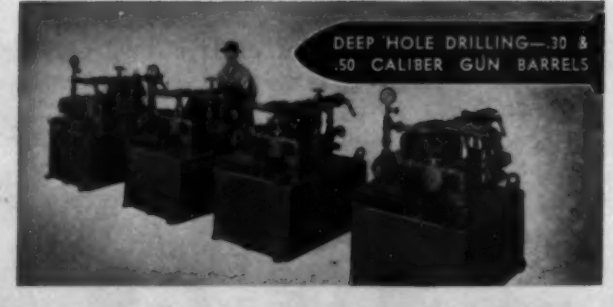
HANDLING FURNACE DOOR OPERATIONS

"You Can Rely on Roper"

ROPER

Rotary Pumps

ENGINEERED TO YOUR REQUIREMENTS



DEEP HOLE DRILLING—.30 & .50 CALIBER GUN BARRELS

Write for Bulletin No. 848

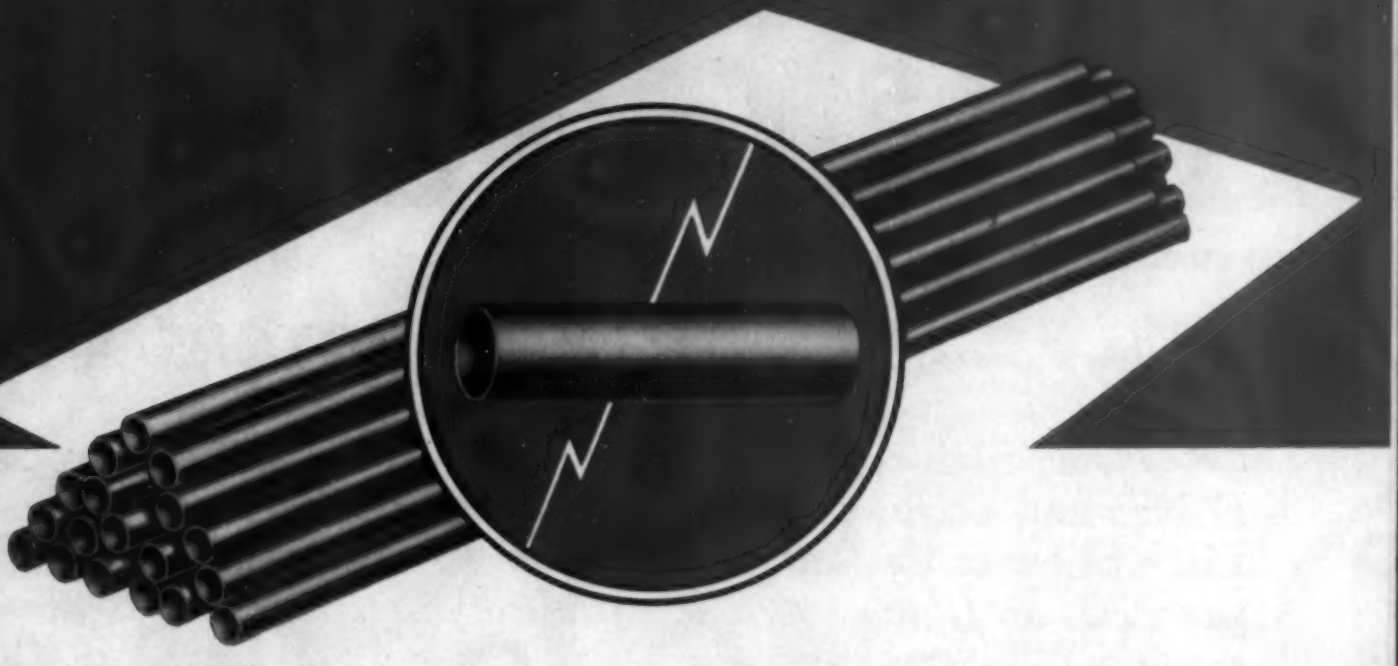
Complete technical data, illustrations, and a digest of factual information on pumps and pumping problems.

GEO. D. ROPER CORP., ROCKFORD, ILLINOIS

PITTSBURGH OFFICE...207-209 BLVD. OF THE ALLIES

UNIFORMITY FOR SAFETY...

...with Talon's Electric Welded Steel Tubing



CONTROLLED uniformity of Talon's Electric Welded Steel Tubing begins with the desired chemical and physical specifications of the hot-rolled strip from which it is formed. It assures safety, ease of fabrication, great strength, and low cost. Close gauge tolerances guarantee uniform wall thickness, concentricity, and unvarying light weight. No surface defects are hidden. Both the inside and outside surfaces undergo constant inspection from production of the strip, through the cold-forming operation on the tube mill, to final inspection. Every foot is hydrostatically tested to withstand tremendous pressure. Size is held consistently on long runs of a given diameter by micro-gauge adjustment of the forming rolls. Talon's Electric Welded Steel Tubing is now made in most sizes from ¾" to 4" O. D.—up to 60 feet in length. These and other sizes will be available for your peacetime production at low cost.

TESTING THE STRENGTH OF THE WELD

Flattening test—with maximum bending at the weld. Talon's Electric Welded Steel Tubing exceeds the permissible limits of all standard tests for physical properties.

TALON . . INC.

STEEL TUBE DIVISION **OIL CITY, PENNA.**

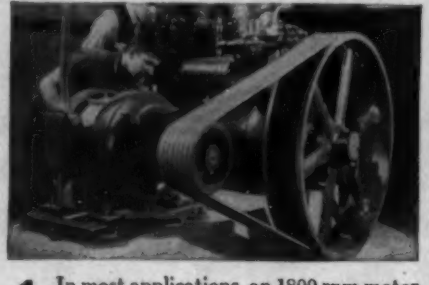
Good Team Great Team

ALLIS-CHALMERS MOTORS AND T

☛ **Using high-speed motors with Allis-Chalmers Texrope Drives and single-speed motors with Allis-Chalmers Vari-Pitch Sheaves and Speed Changers has always been good practise.** ***In time of war it's a vital practise!***

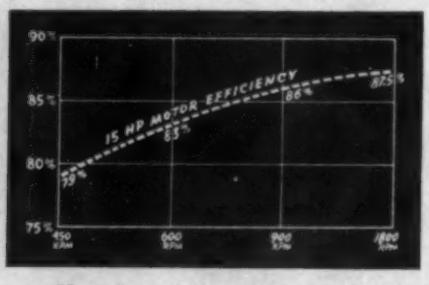
☛ **Such combinations give sharply higher efficiencies—at lower cost in man-hours, money and materials!**

☛ **Allis-Chalmers, only builder of *both* motors and V-belt drives, offers invaluable know-how in teaming them up.**



1 In most applications, an 1800 rpm motor with Texrope Drive will ably do the job of a lower-speed, direct-connected motor —at lower cost in money *and materials!*

2 When you buy an 1800 rpm instead of 450 rpm 15 hp squirrel-cage motor, for example, 600 lb are saved. And *you* save well over $200 — with drive figured in!



3 Note that efficiency rises from 79% for the 450 rpm motor to 87.5% for the 1800 rpm motor. The 1800 rpm motor saves you over 30 kw/24 hr. day.

WE WORK FOR VICTORY — WE PLAN FOR PEACE

ALLIS-C

in Peace . . . in Wartime!

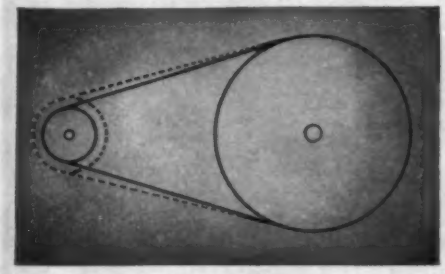
TEXROPE DRIVES

IT'S TIME to take a *fresh* look at motor buying! See below how much you can save with high- and single-speed motors made flexible by Texrope Drives.

Allis-Chalmers, builder of Lo-Maintenance Motors, originated the multiple V-belt drive and Vari-Pitch Sheaves . . . is the only manufacturer building *both* motors and V-belt drives. You benefit when you ask for — and get — the *right* combination of Lo-Maintenance Motor and Texrope Drive!

Call on your nearby Allis-Chalmers district office for facts, figures and advice — or write direct to ALLIS-CHALMERS MFG. CO., Milwaukee 1, Wis.

A 1627



4 Infrequently needed speed changes can be had by changing from one size motor sheave to another. Juggling *complete* drives, range is 1:1 to 7:1.

5 With the Allis-Chalmers Vari-Pitch Sheave, you can increase or decrease speed by adjusting sheave diameter . . . obtaining an *unbroken* series of speeds!

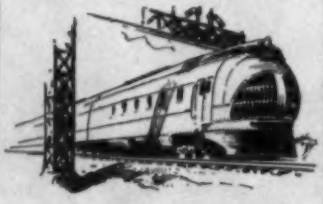
6 Allis-Chalmers Vari-Pitch Speed Changer gives you infinite changes at the turn of a wheel — within 3.75 to 1. It's compact, flexible, *efficient!*

-CHALMERS

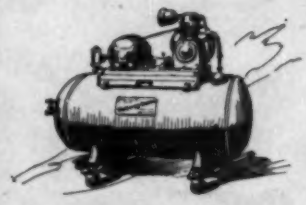
LO-MAINTENANCE MOTORS
TEXROPE DRIVES

ARE PARTS A PROBLEM?

Consider BRAKE SHOE *as a Source*



Parts for Trains



Equipment for Garages

Parts for Excavating

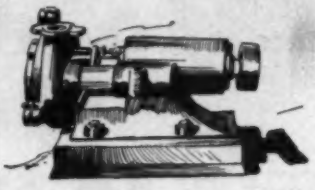
Parts for Oil Drilling

Parts for Planes

Parts in metals, metal alloys and composition.

Parts that are cast, upset, drop forged and molded.

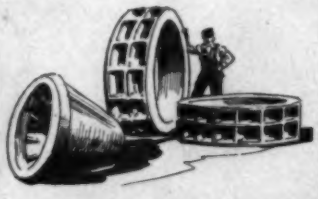
Parts for Cars, Trucks



Industrial Pumps

Parts for Heat Treating

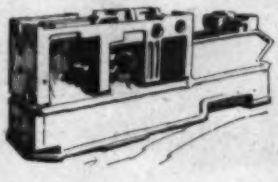
Parts for Ships



Parts for Crushers

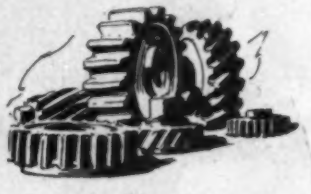
To a manufacturer there just isn't any such thing as an unimportant part, for a piece of equipment is only as good as its weakest part. Knowing this, BRAKE SHOE *engineers* the parts it makes for its customers.

What would closer tolerances in the parts you buy mean in your machine shop costs?

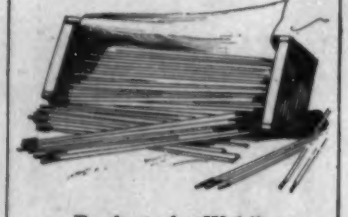


Parts for Machinery

Parts for Shells



Parts for Manufacturers



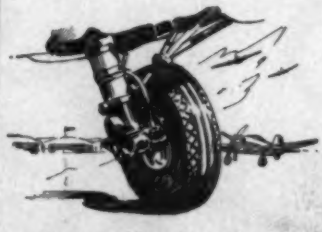
Products for Welding

AMERICAN BRAKE SHOE COMPANY, 230 PARK AVE., NEW YORK 17, N. Y.

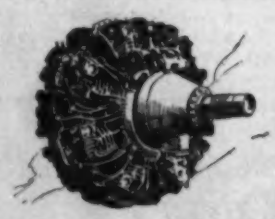
Brake Shoe

58 PLANTS SERVING INDUSTRY AND TRANSPORTATION

American Brakeblok Division	Detroit, Mich.
Ramapo Ajax Division	New York, N. Y.
American Manganese Steel Division	Chicago Heights, Ill.
Brake Shoe & Castings Division	New York, N. Y.
Kellogg Division	Rochester, N. Y.
American Forge Division	Chicago, Ill.
Southern Wheel Division	New York, N. Y.
National Bearing Metals Corp.	St. Louis, Mo.

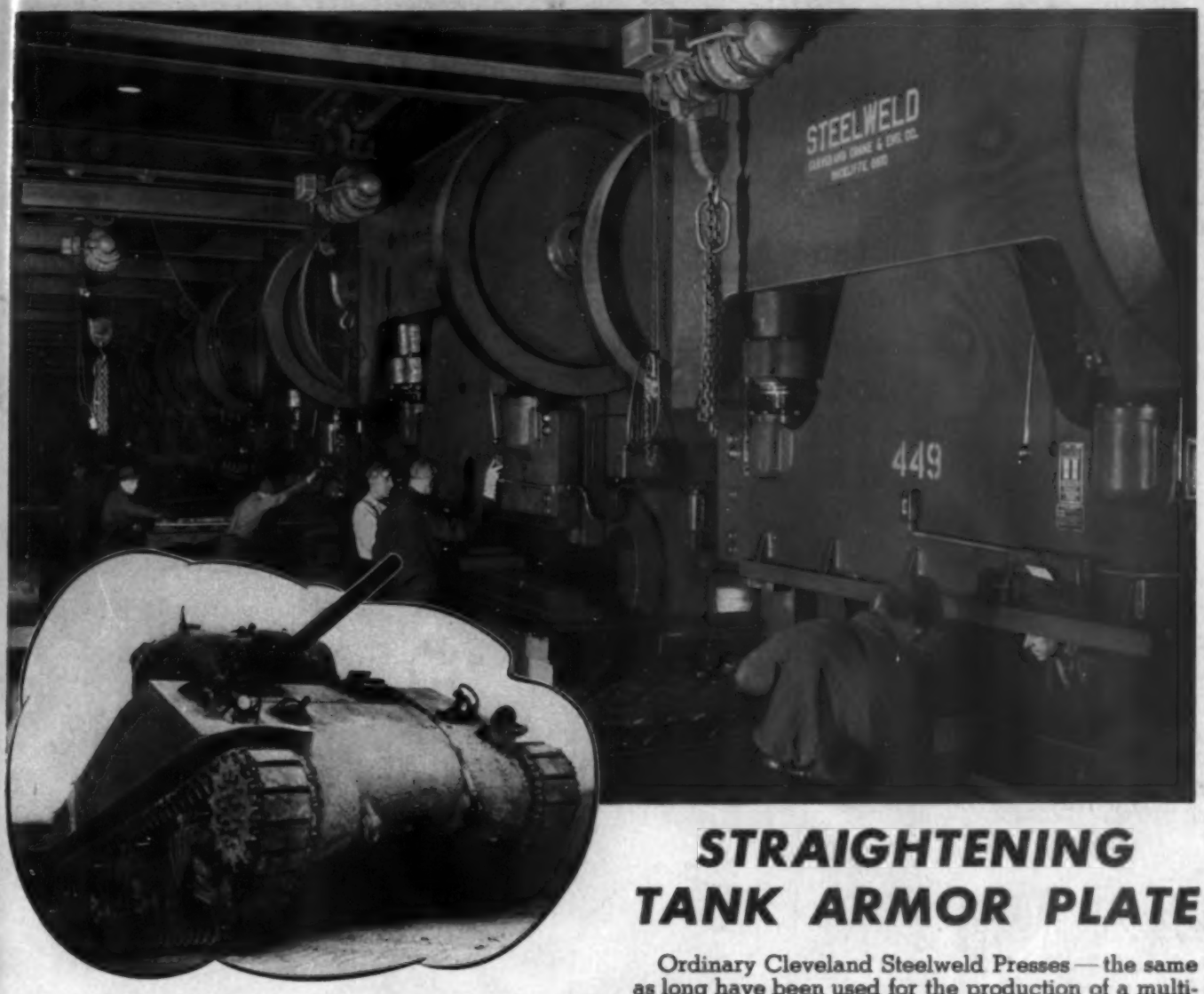


Parts for Landing Gears



Parts for Aircraft Engines

Parts for Tanks



A few of a large battery of Cleveland Steelweld Presses in one plant straightening heavy tank armor plate.

Official O.W.I. Photo by Palmer.

M-4 tank with welded hull construction being tested at Aberdeen (Md.) Proving Grounds. Armor plate for this tank must be perfectly flat to assure accurate tight fits. Both cannon and machine gun are carried in revolving turret.

Army Signal Corps Photo from O.W.I.

STRAIGHTENING TANK ARMOR PLATE

Ordinary Cleveland Steelweld Presses — the same as long have been used for the production of a multitude of peace-time products — are showering heavy blows on thick high-tensile, heat-treated armor plates, straightening them as necessary for tight fits in the building of tanks.

Despite the fact that Cleveland Steelwelds are operating on a far harder, tougher material, that is usually many times the thickness for which they were originally designed, they have been performing with remarkable success on round-the-clock schedules. Like nothing else could possibly do, this work has fully demonstrated the advantages of the all-welded Steelweld frame construction and the plus values built into all parts of every machine.

Today a number of plants have 10, 20, 40, and more Cleveland Steelwelds engaged in armor straightening. They have been a principal factor in eliminating a serious bottleneck in tank production.

In happier days to come presses of the same construction will be bending, forming and punching plate for kitchen cabinets, doors, lockers, boilers, locomotives, and many other metal products.

GET THIS BOOK!

CATALOG No. 2002 gives complete construction and engineering details. Profusely illustrated

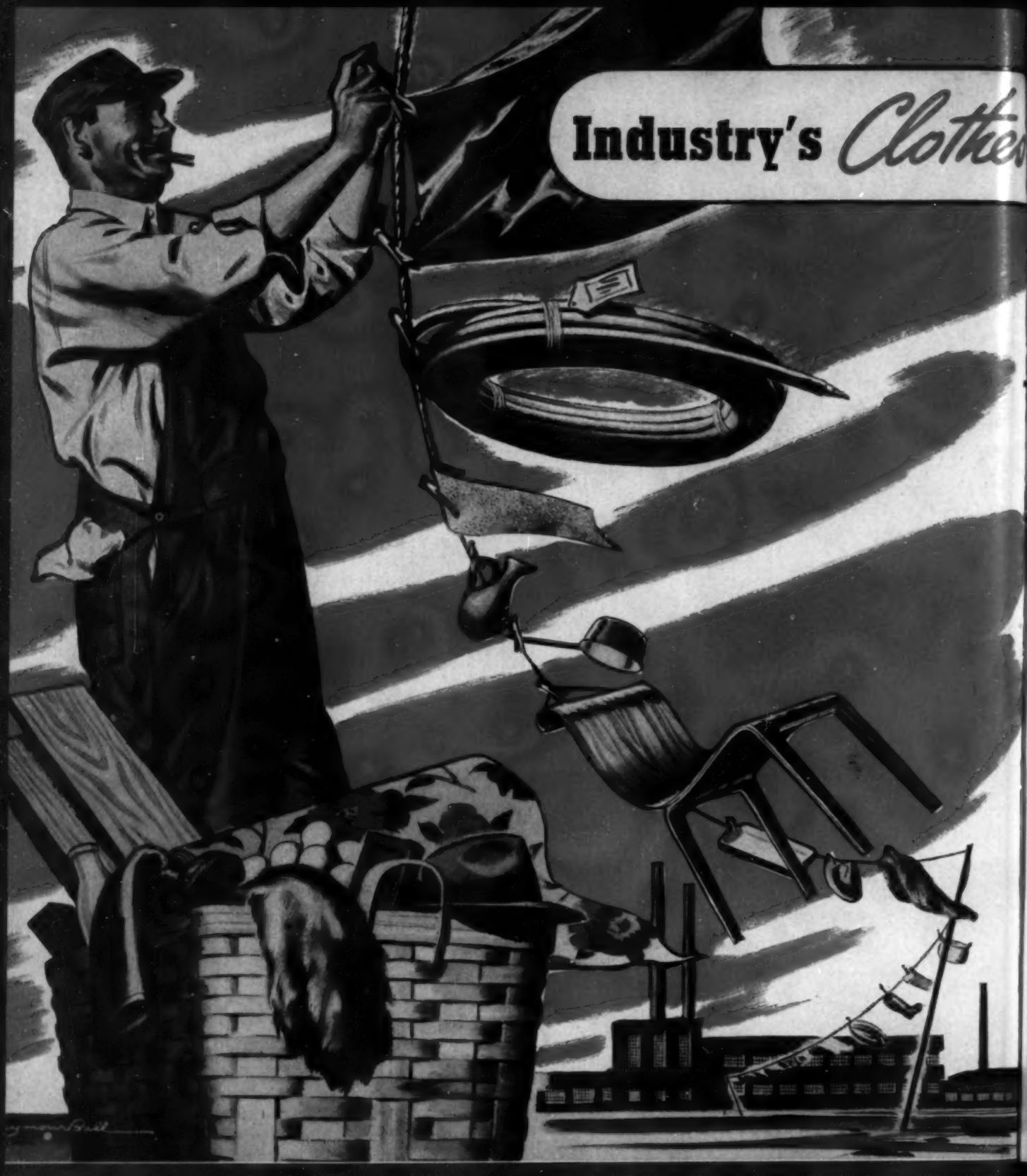
THE CLEVELAND CRANE & ENGINEERING CO.

1125 **EAST 283RD ST.** **WICKLIFFE, OHIO.**

CLEVELAND

STEELWELD PRESSES

GENERAL SALES AGENTS: THE CYRIL BATH CO., E. 70TH & MACHINERY AVE., CLEVELAND



Sturtevant Equipment

REG. U. S. PAT. OFF.

AND SYSTEMS

ENGINEERED FOR PRECISION-VENTILATING, HEATING, AIR CONDITIONING, DRYING, DUST AND FUME CONTROL, PNEUMATIC CONVEYING, MECHANICAL DRAFT

line must be modernized...*for 1945*

MANY ARE THE PRODUCTS that are "hung out" to dry at some stage on their way to battle. And many are the busy war plants where even the best of existing dryers simply couldn't meet today's exceptional demands for increased production and improved products. Admittedly these were tough problems... but we hung out the "do not disturb" sign on the Sturtevant Research Laboratory and went to work.

The result... an improved dryer with a scientifically designed arrangement of tapered nozzles and baffle plates inside the dryer housing, that produces a change of air up to 300 times a minute near the material, permits perfect control of air flow. The increased output and improved quality which followed this application of Sturtevant engineering skill is exemplified by these recent drying projects:

A rubber dryer, five stories high, to apply and vulcanize rubber sheathing on copper wire in one continuous process... to turn it out in a fraction of the former time and in quantities that, if revealed, would make the Axis quake.

Sulfanilamide and other victory-vital chemicals are now processed in Sturtevant dryers where wet and dry bulb temperatures can be instantly regulated... and constantly adjusted to the requirements of each product. And that means more uniform drying of each batch... capacity increased to handle 2,500 pounds of material at a time... with a 50% reduction in drying time.

Reversible camouflage cloth is now dried in continuous ranges which utilize recirculated air combined with outside air, in just the right proportions. As a result, the cloth is delivered at record breaking speeds of six miles an hour... with valuable savings in fuel for heat.

An improved method of introducing air to contact the surface of such materials as sandpaper and pyroxalin cloth eliminates surface defects... speeds production. In the case of rabbit fur, drying time was cut from 24 hours to 15 minutes, handling as many as 8000 pelts an hour! And for a hundred other products, there are a hundred other reasons why Sturtevant Dryers went to work... to turn out war goods faster, more efficiently. Reasons that will be equally important to *every manufacturer* when industry competes for post-war markets.

ENGINEERED AIR will make a difference...

Yes, air that is engineered to serve efficiently—not only in drying but in all phases of industrial air conditioning, heating, ventilating, dust and fume control, pneumatic conveying and mechanical draft—will make the difference between profit and loss in many a plant when industry returns to a highly competitive stage. With new war-won knowledge, Sturtevant is in a position to find the most efficient and economical solution to your approaching problems. Why not call in a Sturtevant expert now and let him consult with your post-war planning committee, and show them how correct engineering can improve the quality of your post-victory products and save time and money in their manufacture?

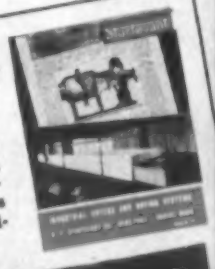
B. F. STURTEVANT COMPANY

Hyde Park, Boston, Mass. *Branches in 40 Cities*

B. F. Sturtevant Company of Canada, Ltd., Galt, Toronto, Montreal

Facts you want about drying today

If you are a plant engineer or industrial executive, you will want to investigate the recent progress in evaporative drying. This new 28 page Sturtevant Catalog #461 discusses the various methods of moisture removal, describes the types of air dryers, shows photos and gives operating data on a wide variety of installations. Write for your copy today.



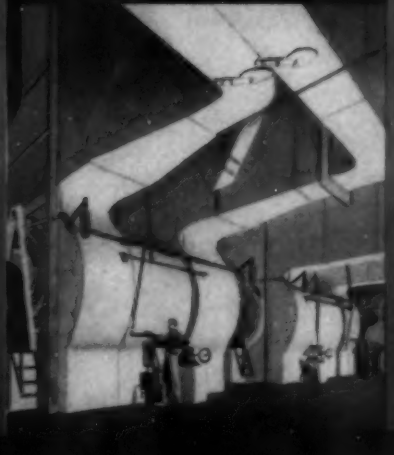
Sturtevant

REG. U.S. PAT. OFF.

Puts Air to Work

AIR CONDITIONING

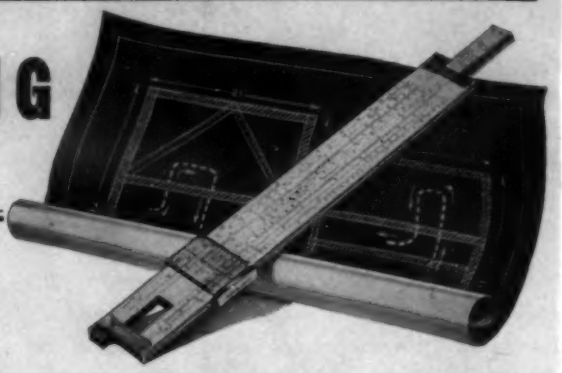
MECHANICAL DRAFT



DRYING AND HEATING

DUST AND FUME CONTRO

OVEN ENGINEERING NEWS



Flexibility, Economy, Efficiency in Three-Zone Finishing Oven

• Designed originally for baking finishes on metal furniture, this three-zone automatic conveyer oven is now used by a large New York metal fabricating company in the finishing of ordnance items. Both oven and trucks were designed by Industrial Oven engineers to obtain maximum flexibility and economy.

Handles Large or Small Work

This oven will handle one truck every five minutes, each truck loaded with 1000 pounds of metal parts, either as large as desks and lockers or as small as land-mine housings. Powered by a floor-type conveyer chain, trucks are propelled automatically through pre-heating, baking and cooling zones which are separated by automatically controlled and motorized doors. All heating and air circulation is likewise automatically controlled.

In the cooling zone, high-velocity outside air is passed over the work and, raised in temperature, is taken into the system as pre-heated make-up air for the air heater. Similarly, in the pre-heat zone, oven exhaust air is used to start the primary evaporation of paint solvents. These factors help make this oven system one of the most economical types for certain finishing problems.

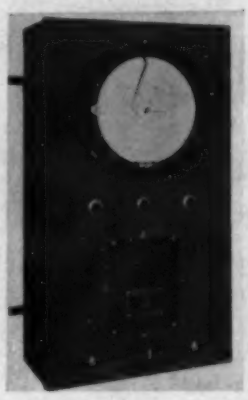
Labor Cost Reduced

Completely automatic controls enable one man to operate the oven, and properly planned slopes of flooring to entrance and exit make his work easier. Free literature is available on this system.

Industrial Oven systems are not limited to heating units and conveyers. Any type of processing and materials handling system can be designed for your needs, whether you are in the metal-working, textile, rubber, plastics, chemical or ceramic industry.

(Feel free to ask for additional information on any fact presented on this page.)

This Is a Typical Industrial Oven Control Cabinet



All Industrial Oven installations are equipped with automatic controls, completely shop-wired and tested as part of the installation. Control components such as timers, interrupters, relays, photo cells and electronic devices are mounted internally but are readily accessible. National electric code standards are followed in every case.

Did You Know?

That in the production of armor-piercing shot, Industrial Oven draw furnaces have set new highs in removal of hardening strains, with negligible quantities of reject losses in runs of 1,000,000 pieces. This is a good example of proper heat treating made possible by even air distribution resulting in uniformity of temperature.

That in Industrial Oven dehydrogenizing equipment ovens, almost complete recovery from acid embrittlement is effected. This was proved in one plant where six ovens are in continuous operation on 30- and 50-calibre cartridge links.

Send for Free Data

A few copies of "Blueprint for Industry", our engineering book on oven and materials handling equipment, are still available. Write today for your copy of this collection of modern data on high-production oven systems.

THE INDUSTRIAL *Oven Engineering* COMPANY

11621 Detroit Avenue **Cleveland, Ohio**

Who knows

THE SHAPE

OF THINGS TO COME?

THE shape shown above, we might as well admit, has never yet been cast. It is a figment of a lively imagination.

During and after the transition from war to peace, the rewards will surely go to those who *imagine* most effectively; whose imagination, made real, will serve Industry most.

Here at Union, while the products of our furnaces and our skills are mainly concentrated on the war, we're thinking hard about what is coming after. It may well be that our postwar-pointed thinking could be of help to you—in making steel and alloy castings that better fit Tomorrow's bewildering needs.

ARMY E NAVY

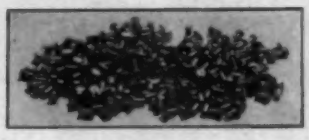
UNION STEEL CASTINGS

Division of Blaw-Knox Company
Pittsburgh, Pa.

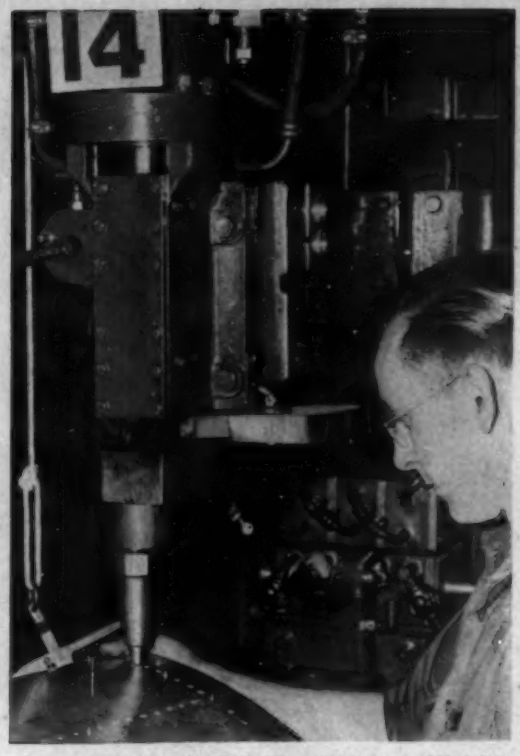
Makers of driving wheel centers ★ locomotive frames ★ pump casings ★ vault doors and frames ★ annealing boxes ★ spindles ★ coupling boxes ★ open hearth charging boxes ★ gear blanks—and other steel and alloy castings for steel mills and general industry.

The Emphasis is on Saving

Mallory Tips Help Save Man Hours and Machinery in Spot Welding the P-40



Spot welding saved all these rivets which would normally be required to assemble the Curtiss P-40 belly cowl.



PHOTOGRAPHS COURTESY CURTISS-WRIGHT CORPORATION

Thanks to phenomenal advances in machines and techniques, aircraft manufacturers have replaced slow, costly riveting with speedy, economical spot welding. This is true not only of non-structural parts such as door and window frames, seats, engine and nacelle cowling—but also of primary stressed assemblies including floor supports, wing ribs and stabilizer leading edges.

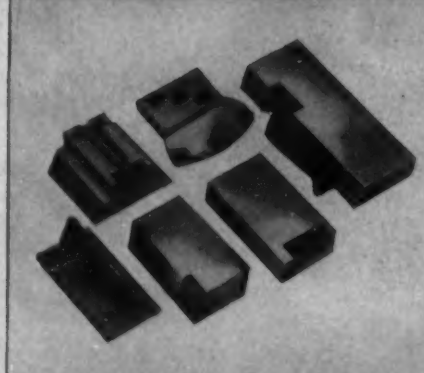
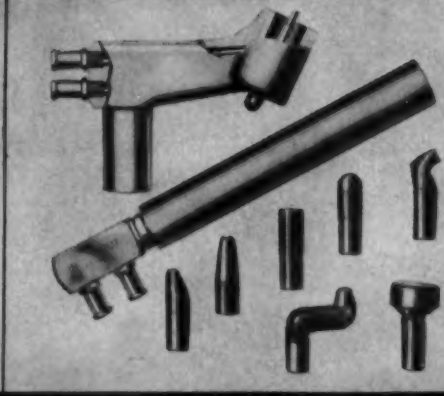
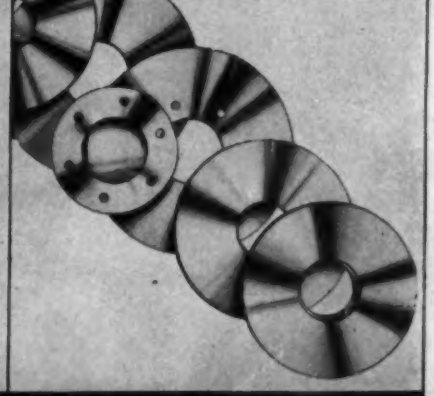
Assembling the Curtiss Warhawk belly cowl, as shown in the photograph, is done on a magnetic impulse type of spot welder equipped with Mallory long-life electrodes. On many similar jobs, a template is laid down and markings made of pilot spots where the operator should weld. Use of spot welding saves man hours and machinery by the elimination of drilling and dimpling for flush riveting, two separate operations.

TECHNICAL SUGGESTIONS on specifying resistance welding electrodes . . . for fabricating either ferrous or non-ferrous metals . . . are yours for the asking from Mallory. Write us today . . . and if you'd like a free copy of the Mallory Resistance Welding Data Book for your guidance, just mention it in your letter.

P. R. MALLORY & CO., Inc.
INDIANAPOLIS, INDIANA
Cable Address — PELMALLO

P.R. MALLORY & CO. Inc.

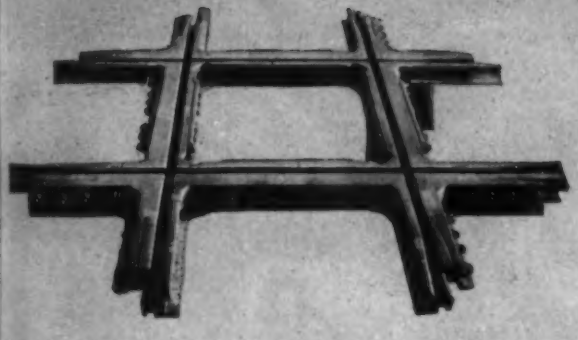
MALLORY *Standardized Resistance Welding Electrodes*

FLASH, BUTT, PROJECTION WELDING DIES	SPOT WELDING TIPS AND HOLDERS	SEAM WELDING ROLLS
		

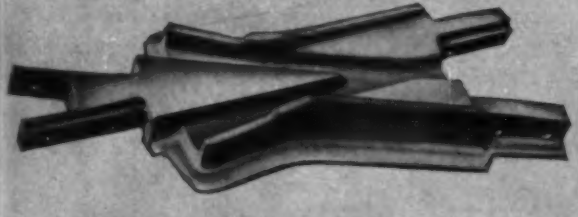
SPEEDIER PRODUCTION · LESS DOWN TIME · BETTER WELDING · LOWER COST

Courtesy of Pennsylvania Railroad

WHAT STEEL COMPANY FIRST USED MANGANESE STEEL FOR TRACKWORK?



Crossing made of Solid TISCO Manganese Steel



TISCO Manganese Steel Frog

WHEN electric cars replaced horse cars back in the nineties, a new trackwork problem was presented. Switches, frogs and crossings were giving way under impact of the heavier vehicles. A steel with unusual resistance to both shock and wear was urgently needed.

TISCO Hadfield's Manganese Steel provided the answer. Frogs installed by the Brooklyn Atlantic Avenue Street Railway in 1894, withstood the impact of a heavy trolley every 27 seconds and quickly proved their worth. The first railroad to adopt TISCO Manganese Steel trackwork was the Pennsylvania, in 1900.

Today, after 50 years, TISCO Hadfield's Manganese Steel is famous throughout the world for use on special trackwork, as well as mine and quarry equipment—power shovels and dredges—paper-making machinery and other industrial applications requiring utmost resistance to heavy abrasion and impact.

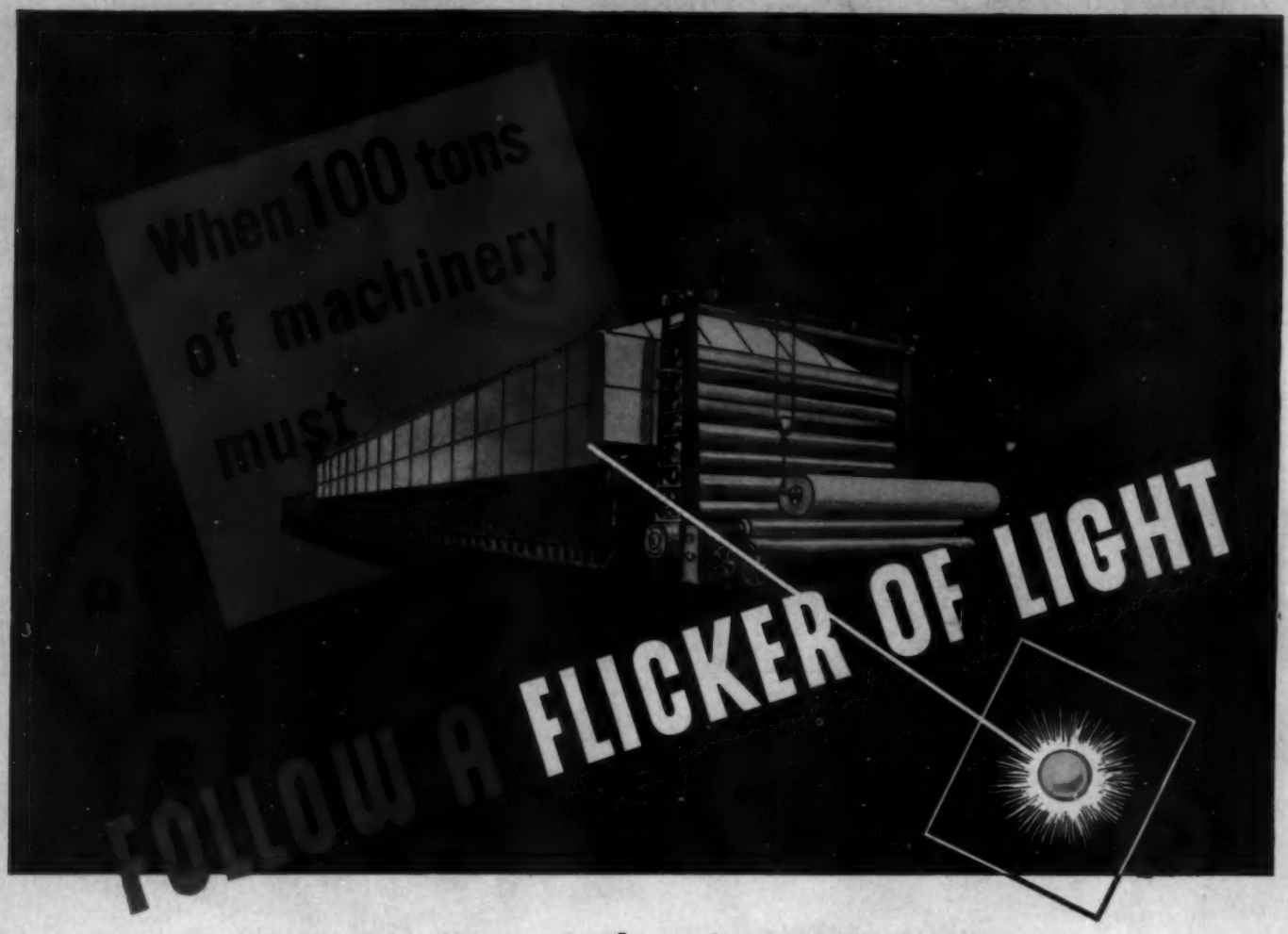
FOUNDED TW 1742

Taylor-Wharton Products

MANGANESE STEEL CASTINGS
HIGH PRESSURE GAS CYLINDERS
ALNICO PERMANENT MAGNETS
ALLOY CASTINGS AND FORGINGS
MANGANESE-NICKEL WELDING ROD
SPECIAL TRACKWORK

Taylor-Wharton Iron and Steel Co.

HIGH BRIDGE, NEW JERSEY • EASTON, PENNSYLVANIA



It's another job for the AMPLIDYNE

The edge of a speeding strip of paper moves one hundredth of an inch and a winder roll instantly readjusts its position.

A strip of steel speeds by at 25 miles an hour and a flying shear jumps into action to cut 33-ft lengths with an accuracy of 0.1 per cent.

In industry after industry, small electrical signals such as the power output of photo and other electronic tubes are working "miracles" in the control of processes and product quality—with the aid of G-E AMPLIDYNES.

Within less than 1/10th of a second, the amplidyne can magnify a 1-watt signal from vacuum tubes, pilot generator, or other source into a powerful 10,000-watt working output. Thus it can assume the duties of heavy-current contactors, and eliminate many other conventional control devices.

The amplidyne will not change characteristics or get out of adjustment. Yet it is immediately adjustable to meet changed production requirements. Similar to conventional m-g sets, it is sturdy, long-lived, presents no unusual maintenance problems.

The versatile amplidyne is finding wide and dramatic use in automatic control of voltage and current, speed and acceleration, torque and tension, thickness and width, color register—even in finger-tip positioning of massive machinery. New uses for it appear almost daily wherever an electrical signal can express the need for a change in an electrical operation.

A G-E application engineer will gladly suggest how the amplidyne fits in with your plans for present and postwar production improvements. Call on him through our local office. *General Electric, Schenectady, N. Y.*

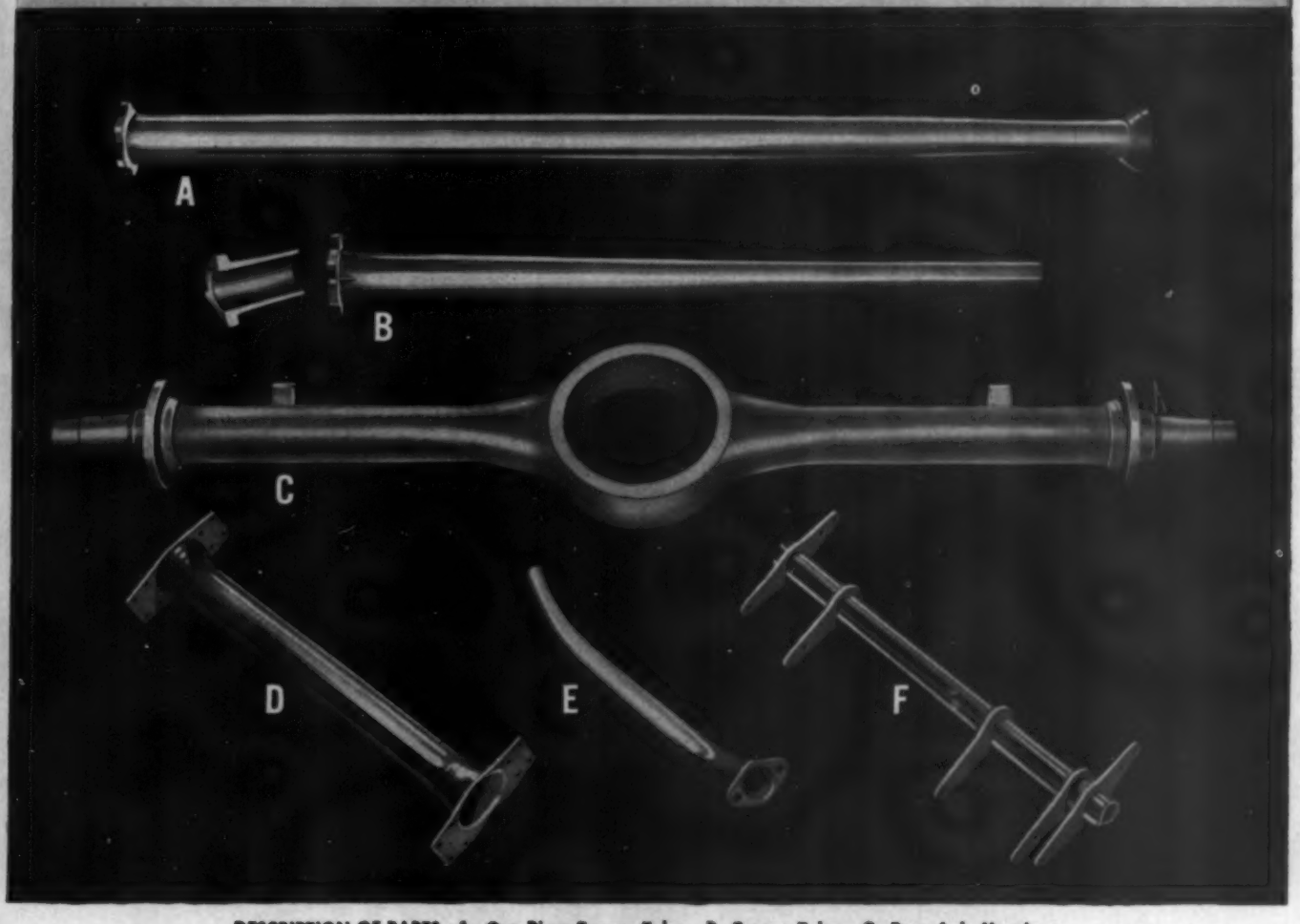
THE STORY OF THE G-E AMPLIDYNE

This 36-page book tells how the amplidyne works and describes typical applications. Send for your free copy of "The Short Circuit That Moves Mountains" today.

GENERAL ELECTRIC

AMERICAN METAL PRODUCTS COMPANY

Manufacturers of Welded Steel Tube, Tubular Parts and Assemblies for the Transportation Industry



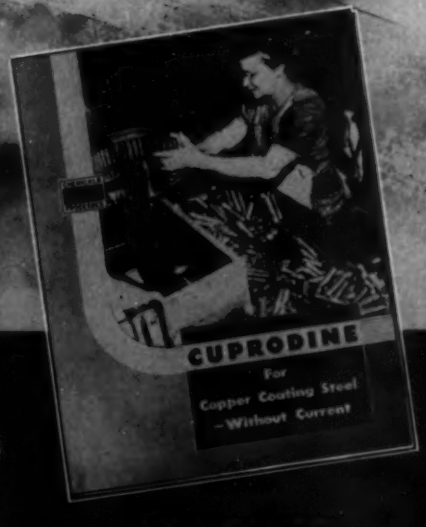
DESCRIPTION OF PARTS: A—One Piece Torque Tube. B—Torque Tube. C—Rear Axle Housing. D—Frame Rear Cross Tube. E—Spare Wheel Carrier Arm. F—Brake Cross Shaft.

We are serving transportation manufacturers in war, as in peace, with quantity produced welded-steel tubular parts made by the hot and cold process . . . upsetting, forming, swaging, forging, welding, heat treating and machining.

AMERICAN METAL PRODUCTS COMPANY, 5959 LINSDALE AVE., DETROIT, MICHIGAN

Their Lives— or Yours . . .

CHEMICALS ACP PROCESSES



RODINE is a chemical pickle inhibitor effectively controlling the attack of pickling acid on steel without retarding removal of scale or rust. Rodine reduces noxious and corrosive fumes and improves pickling conditions. The Rodine controlled acid bath enables you to clean more metal in less time and eliminates spoilage from over pickling.

DEOXIDINE phosphoric acid type metal cleaner, removes light oil and annealing scale . . . also eradicates rust and rusters. Deoxidine is available for immersion process and for brush or spray application where indicated to expedite production. Deoxidine meets U. S. Ordnance Department requirements for its efficiency in removing rust and neutralizing rust producers before protective finishes are applied.

CUPRODINE has contributed materially in the production of shell cases from steel. The bright, adherent copper coating it produces on clean steel, by simple immersion, minimizes die wear, prevents metal pick up, reduces scratches and breakage in drawing operations. Cuprodizing steel, in metal fabrication, increases the life of dies from five to ten fold.

SPLIT SECONDS COUNT

Every metal part in plane, gun or shell must be flawless—lives are at stake.

From steel mill to finishing room ACP Chemical Products are helping to produce better finished parts, at greater speed, with fewer losses in spoilage and at a substantial saving in labor and materials.

These processes are old. Chemicals have, however, been developed to adapt them to speeding the production of war materiel. There is no need to experiment on your part—each has proved its ability to save time and manpower and produce better results. Send today for one or all of these descriptive folders.

Manufacturers of Inhibitors & Metal Working Chemicals

AMERICAN CHEMICAL PAINT CO.

AMBLER ACP PENNA.

LITHOFORM

produces a dense, adherent, stone-like coating of zinc phosphate on galvanized iron and other zinc or cadmium surfaces which forms a lasting bond between paint and metal. Lithoform is recognized by the U. S. Army and Navy as a proper method of preparing galvanized and zinc coated surfaces for paint.

AMERICAN CHEMICAL PAINT COMPANY, AMBLER, PA.

Please send me pamphlet on

Deoxidine ☐ Rodine ☐ Lithoform ☐ Cuprodine ☐

Name_____ Title_____

Company_____

Address_____

Note—West Coast Plants may address inquiries and orders for prompt delivery to Leon Finch, Ltd., 728 East 59th St., Los Angeles, Calif.

F-8

From Mine to Furnace

CLIFFS CYCLE *of* SERVICE

LAKE SUPERIOR IRON ORES

VESSEL TRANSPORTATION · · · COAL

C C I C

THE CLEVELAND-CLIFFS IRON CO.

CLEVELAND · · OHIO

Remember it? The dim vision of masks and gowns, of lights and gleaming things? They were phantom glimpses in a troubled dream, the night your life was saved — fragments of a shining world of science and strange skills . . .

And every appliance, every gleaming instrument — every sterile garment, swab and bandage — every accessory and apparatus there in the room, that night — was the product of machine tools, or was processed on equipment built by machine tools.

From giant hydraulic presses to the finest internal grinding machines, literally hundreds of machine tools played a part, the night your life was saved.

And of all those unseen instruments that helped to save your life that night, none is more basic to the creation of *everything* that affects your life today than the internal grinding machine.

Bryant Chucking Grinder Company

Springfield, Vermont, U. S. A.

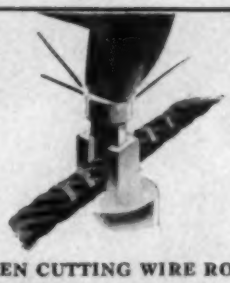
"Old friend . . . fine wire rope"

Several thousand miles to the west of where you're reading this, an American face lights up as a welcome friend from home arrives.

Back here in the States, like thousands of others now in uniform, he learned the friendliness of dependable Wickwire Rope.

He knows *you* need Wickwire Rope, too, to keep things running on the home front. So he appreciates *your* contribution in making the rope you already have last longer, so more can be spared for the important work over *there*. But when you *do* order, won't you take it in coils when the lengths permit—so the handier reels can go to the front? Wickwire Spencer Steel Company, 500 Fifth Ave., New York.

For outstanding production accomplishments, Wickwire Rope was the first in all New England to win the coveted Maritime M and Victory Fleet Flag.



WHEN CUTTING WIRE ROPE, seizing is important, whether it is preformed or standard lay. The free book "Know Your Ropes" will help your new men (old, too!) learn the right and wrong ways to care for and handle wire rope to make it last longer. Send for your free copy.

SEND YOUR WIRE ROPE QUESTIONS TO WICKWIRE SPENCER

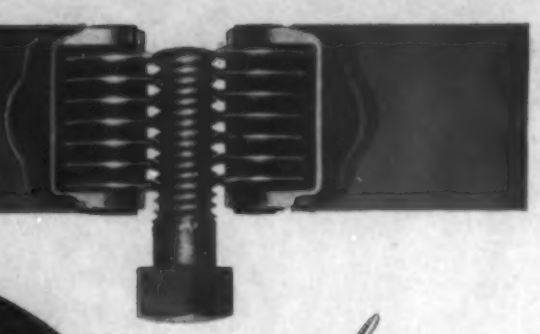
WICKWIRE — WICKWIRE SPENCER STEEL COMPANY

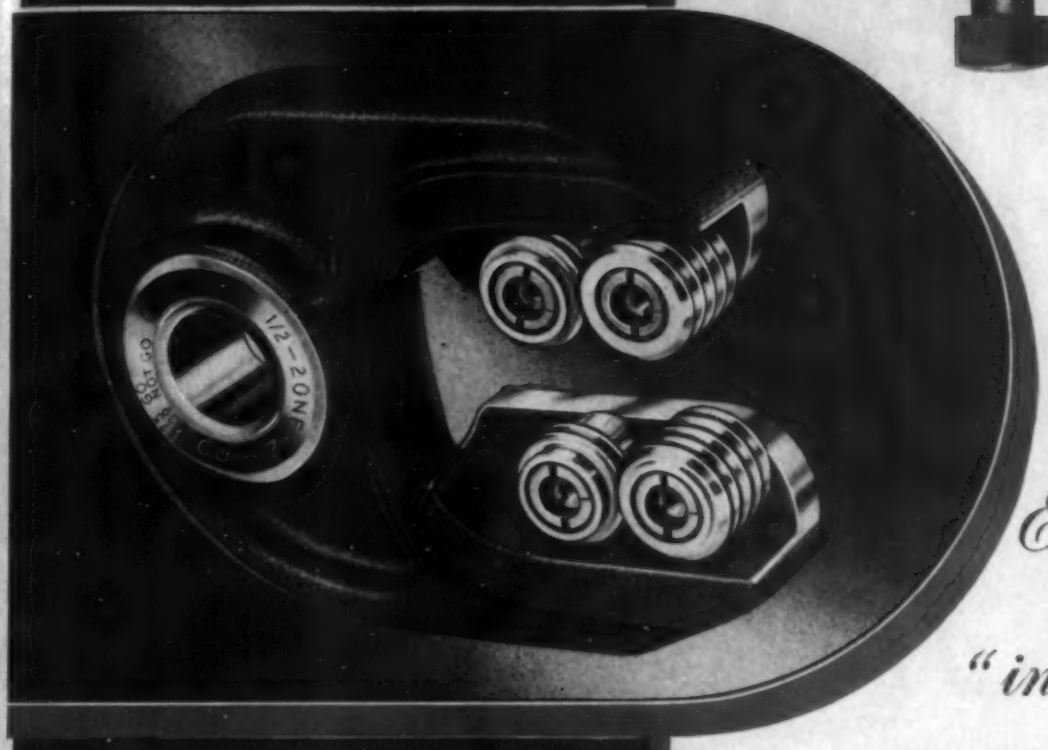
WICKWIRE ROPE

Sales Offices and Warehouses: Worcester, New York, Chicago, Buffalo, San Francisco, Los Angeles, Tulsa, Chattanooga, Houston, Abilene, Texas, Seattle. Export Sales Department: New York City

WISSCO PRODUCT

NOW - YOU CAN GET





for Speedy Accurate Economical "in process" gaging of Threaded Parts

Greenfield John-Sons

ROLL THREAD SNAP GAGES

The Roll Thread type of Snap Gage is ideal for gaging work on the machine. Its open end construction permits rapid application of the gage to the threaded part. The rotating rolls increase the life of the gaging ribs and the effective life of the gage.

Now you can get Roll Thread Snap Gages from "*Greenfield*," the source you've always looked to for quality gages to guard the accuracy of your product. Send at once for descriptive booklet, giving complete information, and instructions for ordering Roll Thread Snap Gages.

GREENFIELD TAP AND DIE CORPORATION
GREENFIELD, MASSACHUSETTS
DETROIT PLANT: 5850 Second Blvd.
WAREHOUSES in New York, Chicago, and Los Angeles
In Canada: GREENFIELD TAP AND DIE CORP. OF CANADA, LTD., GALT, ONT.

GTD GREENFIELD
TAPS • • • DIES • • • GAGES • • • TWIST DRILLS • • • SCREW PLATES

BEARING SECURITY

ARE ESSENTIAL TO THE SECURITY OF BEARINGS. THEY PREVENT THE ATTACK OF GRIT AND MOISTURE FROM THE OUTSIDE. THEY PREVENT LUBRICANT LEAKAGE FROM THE HOUSING. BEARINGS SO PROTECTED DELIVER MAXIMUM PERFORMANCE, REQUIRE THE LEAST MAINTENANCE AND SHOW THE LONGEST SERVICE LIFE.

The Cost of this Security is Negligible and it is Easy to Apply. CONSULT CHICAGO RAWHIDE ENGINEERS.

CHICAGO RAWHIDE MANUFACTURING COMPANY
1308 ELSTON AVENUE • CHICAGO, ILLINOIS
64 Years Manufacturing Quality Mechanical Leather Goods
Exclusively and now Sirvene Synthetic Products
PHILADELPHIA • CLEVELAND • PITTSBURGH • NEW YORK • CINCINNATI • DETROIT • BOSTON

YOUR LIFE WILL BE . . .

Perhaps you take no stock in things occult! Perhaps you wouldn't believe what this mystic might predict. And we don't ask you to. But it *is* entirely possible to peer into the future lives of rotating parts. In fact, it's being done every day—through the medium of the Dynetric Balancing Machine. And it's done for thoroughly practical reasons—to detect and correct their weaknesses in static and dynamic balance—to protect them against vibration and excessive wear—to insure the longest possible life and the most efficient service. And there's nothing mysterious about it!

At Gisholt, the Army-Navy "E" and the Treasury flag fly side by side.

GISHOLT MACHINE COMPANY
1217 E. Washington Avenue
Madison, Wisconsin

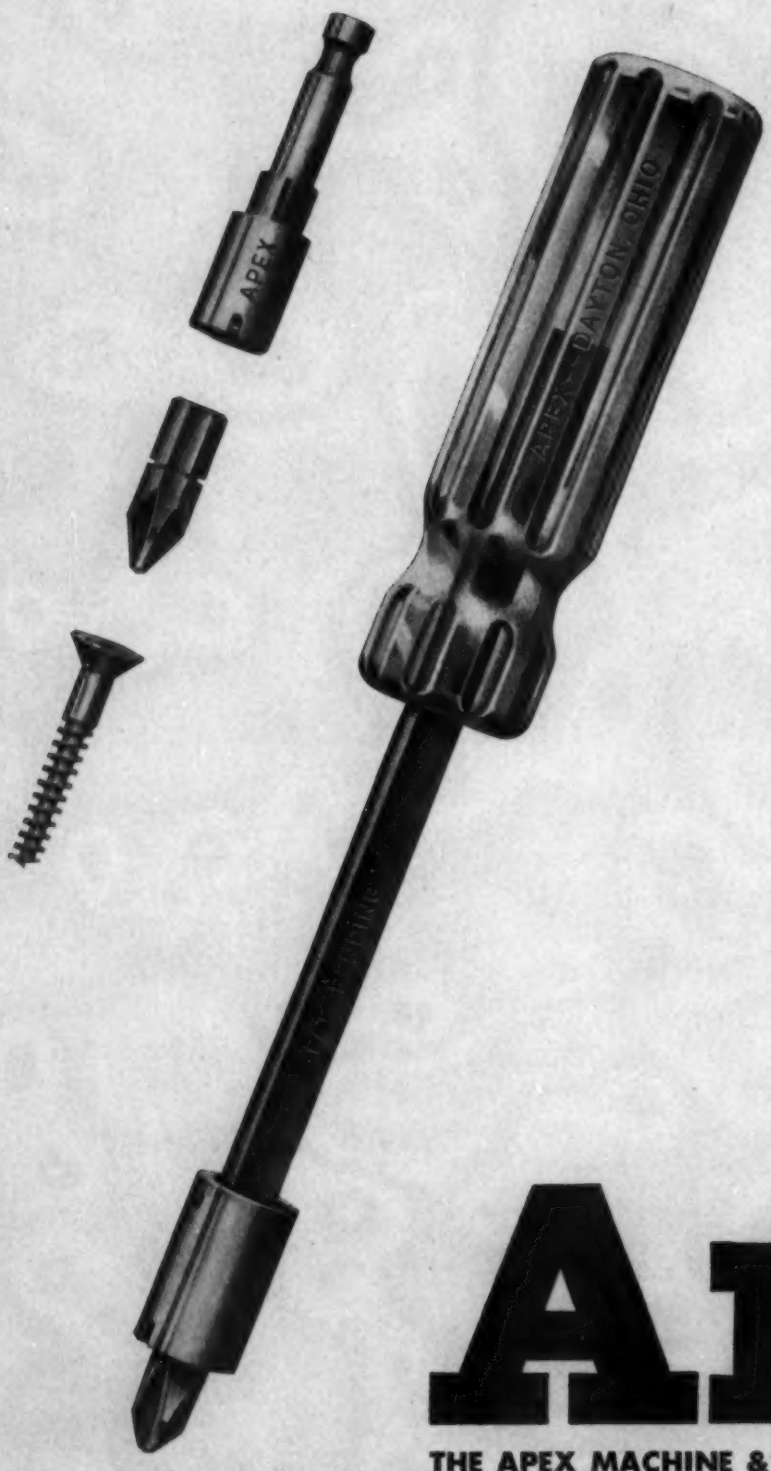
GISHOLT DYNETRIC BALANCING MACHINES *enable you to foresee the hazards which affect high speed rotating parts and to eliminate them. Electronic tubes clearly reveal unbalanced vibrations by amplifying them as much as 1,600,000 times. Literature on Dynetric Balancing is yours on request.*

GISHOLT

Look Ahead . . . Keep Ahead . . . With Gisholt Improvements

TURRET LATHES • AUTOMATIC LATHES • BALANCING MACHINES

Again Apex helps the users of Phillips Screws!



APEX announces a series of bit holders that revolutionizes the use of Power Bits and Hand Drivers for Phillips Recessed Head Screws. Here's what they do:

One Save you money after original installation of holders is made because they eliminate necessity of carrying so many different sizes of screw driver bits. Only item necessary to carry in stock is the insert tips. One range of inserts fits various sizes of holders.

Two Save vitally needed critical steel and release it for other war time users.

Three Increase bit life due to the float between insert and holder, allowing for easier direct alignment with recess in screw.

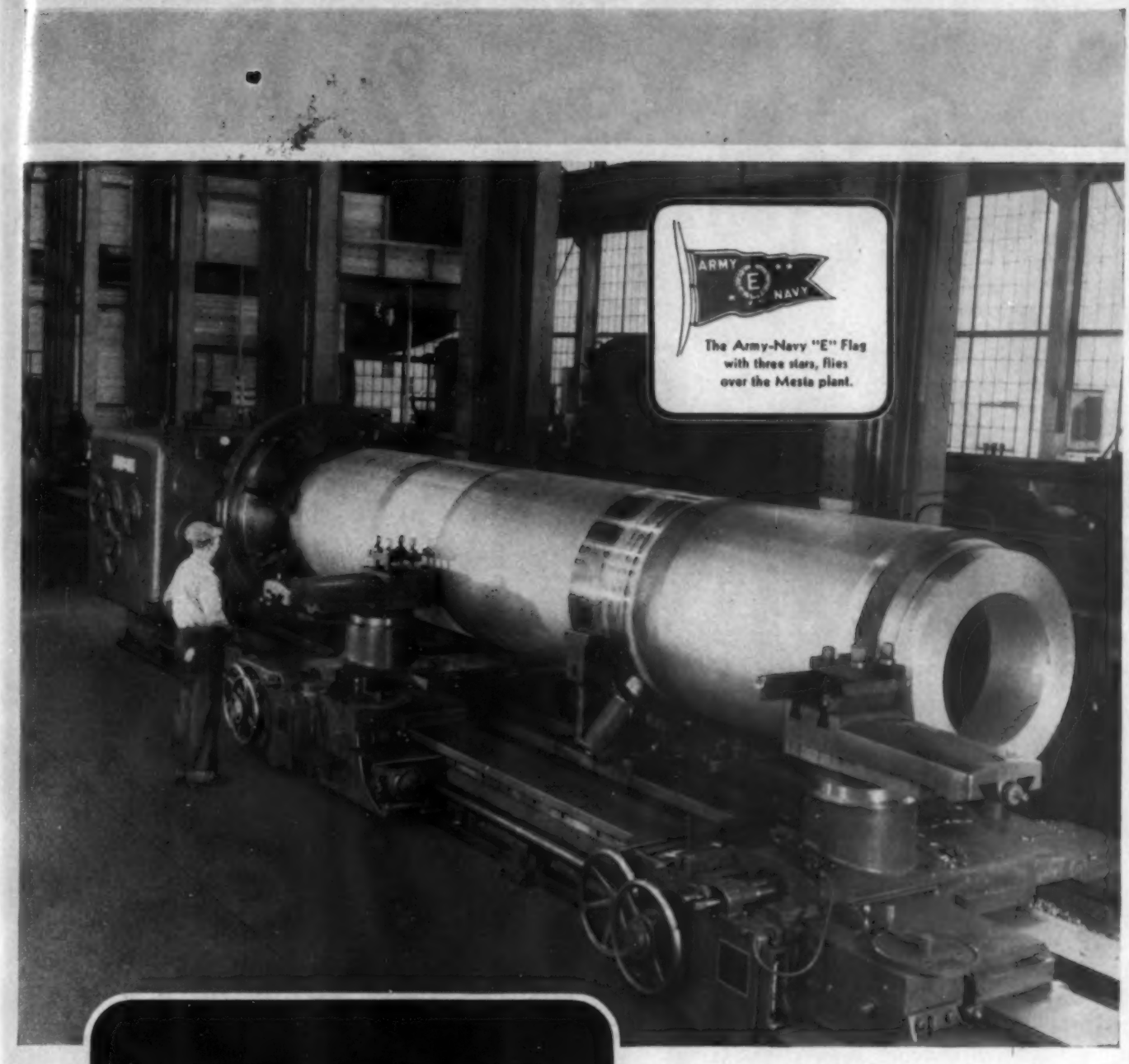
Four Decrease handling cost of screw driver bits because it is no longer necessary to return screw drivers for reconditioning as cost of inserts is approximately that of the reconditioning charge.

Send for Bulletin No. 102 giving complete details.

APEX

THE APEX MACHINE & TOOL COMPANY • DAYTON, OHIO

Manufacturers of Power Bits for Phillips, Slotted Head and Clutch Head Screws; and Hand Tools for Phillips and Clutch Head Screws.



The Army-Navy "E" Flag with three stars, flies over the Mesta plant.

MESTA FORGINGS

One Piece Forged Steel
High Pressure Accumulator Bottle
Produced Complete in the Mesta Plant

MESTA MACHINE COMPANY. PITTSBURGH, PA.

Streaking through the water at speeds of 60 miles an hour, PT Boats pack more speed and hitting power for their size than any other naval craft afloat. Their capacity to deal death and destruction — like a thunderbolt — makes them one of Uncle Sam's most feared killers of the sea.

★ ★ ★

Double Over-Arms Provide a DUAL ADVANTAGE in Milwaukee Milling Machines

Rigidity and convenience—the Milwaukee double over-arm — scores heavily on both counts . . . No other means of arbor support is quite the equal of the double over-arm in *rigidity* — an indispensable quality in any milling machine.

No other means of arbor support affords quite the same quick and easy access to the milling cutter — just a few simple motions and both cutter and arbor are free — an important convenience to the operator at all times.

KEARNEY & TRECKER
CORPORATION
MILWAUKEE 14, WISCONSIN

Buy Victory
with at least 10% in War Bonds!

[redacted] MACHINE TOOLS

Let's Put The Scrap Into The *Scrap!*

Turnings, clippings, short ends, worn out or broken tools — all these are valuable as precious scrap for remelting in the production of new steel. Surprising amounts of dormant scrap accumulate in every plant daily — collect it — segregate it. Set up a system for the regular pick-up and handling of this valuable raw material. Remember, it's a war on waste, too, and every bit of scrap *collected* counts in production for Victory.

18 CAM MILLING METHODS

. . . Described and Explained in this Kearney & Trecker Corporation Bulletin

Machining and milling cams of various types present special problems. This series of articles, reprinted from American Machinist in bulletin form, explains methods of cam milling from the practical shopman's viewpoint.

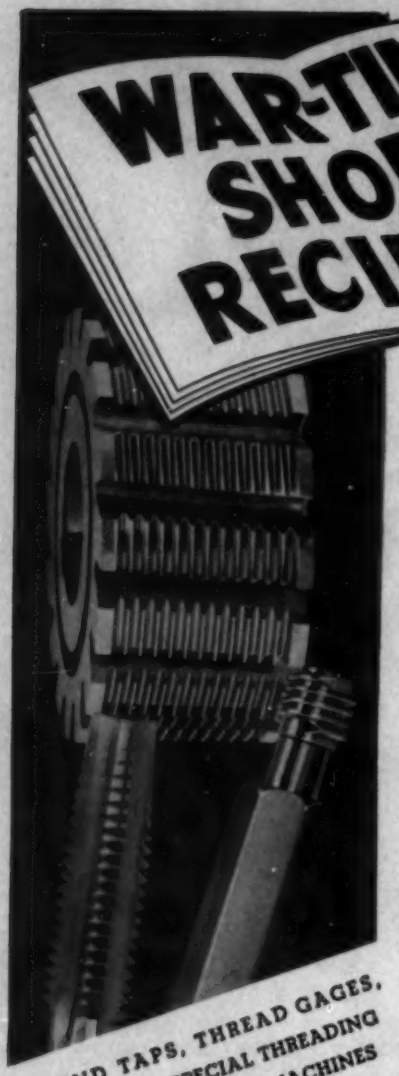
Many machine setups are illustrated, including working diagrams. Eighteen cam milling methods are described, such as use of the Rotary Table, Dividing Head, Dummy Templets, Rotary Head Milling Machine, etc.

Written by the department of Industrial Research, Kearney & Trecker Corporation, this bulletin will prove valuable to every shopman. Write Dept. CM for your copy.

Buy Victory with at least 10% in War Bonds!

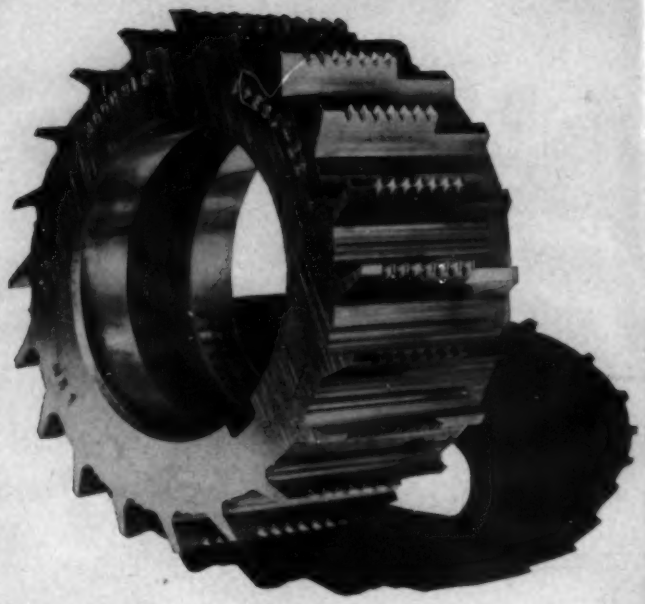
Kearney & Trecker *Products* CORPORATION
MILWAUKEE, WISCONSIN
Subsidiary of Kearney & Trecker Corporation

Kearney & Trecker
CORPORATION
Milwaukee, Wisconsin



MAKE *Sharpening* EASIER

No. 4 in a series



Parts produced with this Detroit Tap and Tool combination thread milling and boring cutter were superior to those produced with competitive spiral gashed cutters.

GROUND TAPS, THREAD GAGES, THREAD HOBS & SPECIAL THREADING TOOLS. SPECIAL TAPPING MACHINES

For many years it had been the accepted practice in certain high precision thread milling operations in aircraft engines to use spiral fluted hobs. Today, as the result of a suggestion from Detroit Tap engineers, straight fluted hobs like the one above are used for this operation.

Result No. 1: Even relatively untrained women can sharpen these cutters accurately now, whereas the spiral fluted types were very difficult to sharpen.

Result No. 2: Thread accuracy is even better than with the spiral fluted hobs.

The reasons: The main purpose of spiral-fluting is to reduce impact. In internal milling with more than one set of teeth in contact at one time, spiral fluting is frequently unnecessary. Straight fluted hobs are always easier to sharpen accurately than spiral fluted types.

This is just one of the many examples of how Detroit Tap field engineers have helped to improve accuracy, simplify production, and reduce cost in threading operations. Sometimes a little change will make all the difference. They'll be glad to help you too.

DETROIT TAP & TOOL CO.

8432 BUTLER STREET, DETROIT, MICHIGAN, U. S. A.

THERE is only one Bridge to Peace . . . and that is the Bridge to Victory American workers and fighting forces are building with their common effort. Every job we undertake today is part of that great structure.

Much of our wartime activity has consisted of fabricating and erecting steel structures, the normal products of American Bridge. These include industrial buildings for the manufacture of airplanes, tanks, armor plate and ordnance; mills and plants for the production of such critical materials as steel, aluminum, magnesium, chemicals and rubber; shipyards; hangars; electric power stations.

And with the flexibility so typical of our engineering and operating organizations, we have undertaken also the manufacture of war products not closely related to our normal work —shaped plates and prefabricated sections for cargo ships; flight decks and sub-assemblies for naval craft; gun mount assemblies; cartridge case discs; traveling cranes; and even completely outfitted tank landing ships.

We value the opportunity of taking such a diversified part in war production. But tomorrow, when the Bridge to Peace is complete, you'll find us "doing business at the old stand" as fabricators and erectors of structural steel, better prepared than ever to serve your post-war needs.

AMERICAN BRIDGE COMPANY

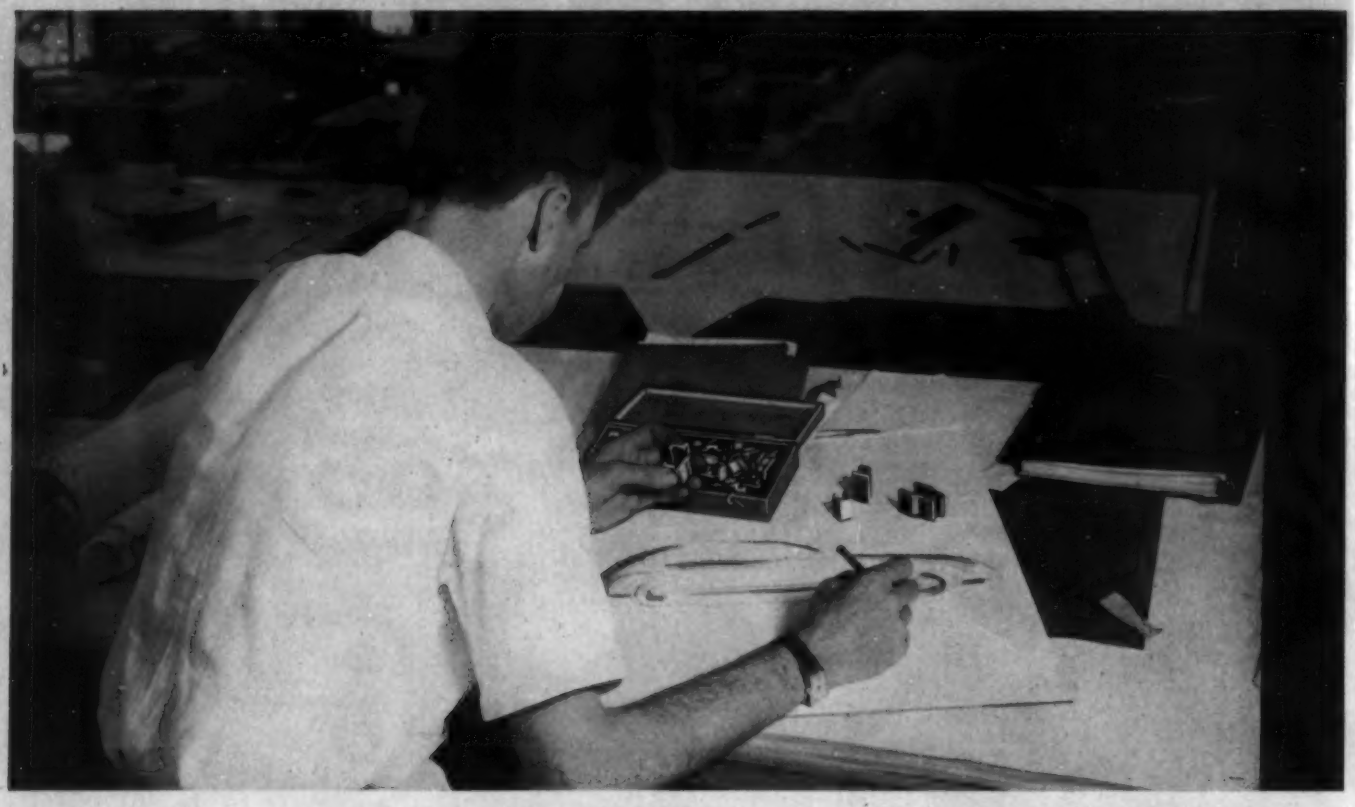
General Offices: Frick Building, Pittsburgh, Pa.

District Offices in: Baltimore · Boston · Chicago · Cincinnati · Cleveland · Denver · Detroit
Duluth · Minneapolis · New York · Philadelphia · St. Louis

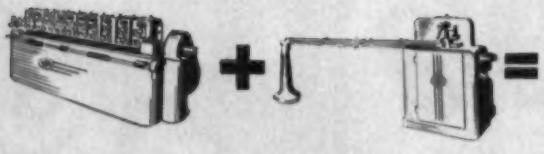
Columbia Steel Company, San Francisco, *Pacific Coast Distributors* · United States Steel Export Company, New York

UNITED STATES STEEL

IN THE BOX . . . PAST HISTORY!



ON THE TABLE HISTORY IN THE MAKING!



By the rollforming of strip metal—the speediest known method of shaping parts—many fabrication problems have been solved.

*STRENGTH is added to parts.
*CHEAPER base metals can be used.
*MACHINING is reduced or eliminated.

For over thirty years, The Yoder Company has engineered and manufactured a complete line of rollforming machines and auxiliary equipment. A multitude of applications for these machines have been developed and much has been accomplished!

However, this is not the end of the road, but the beginning! We know that manufacturers, product designers and marketers will be asking questions, seeking products that can be made at costs that will leave a good profit, new things to make and items that will "sell."

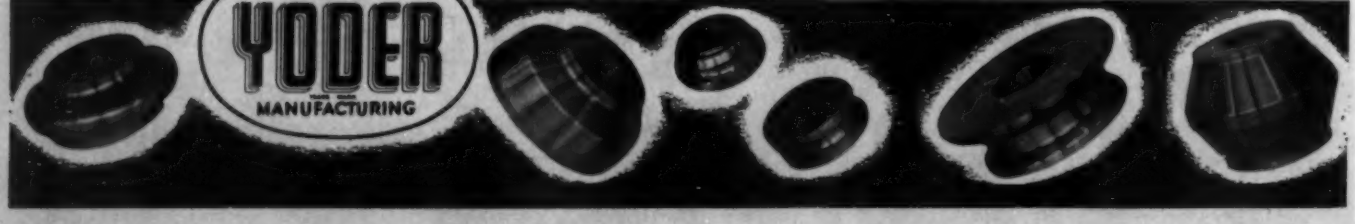
If you have a product and would like to know whether Yoder rollforming has something for you—if you "have a hunch" on a new product to make and you think this might "be the way"—if you are "stumped"—won't you write us? Send rough sketches, blueprints and notes. That's the way things are made to happen. That's the way history is made!

THE YODER COMPANY • CLEVELAND, OHIO, U. S. A.

Buy War Bonds

METAL • FORMING • PRODUCTION • MACHINERY

ENGINEERING YODER MANUFACTURING



IT'S CHEAPER THAN RESHAPING STANDARDS

Grinding down standard carbide tools to shapes for special steel-cutting jobs is an expensive and generally an inefficient operation.

In all tool grinding operations labor must be sufficiently skilled to prevent localized heating of the tool. When special tools are ground the considerations of special rake and cutting edge angles are added.

These factors can be economically controlled by the use of expensive equipment when special tools are ground on a mass production basis, but—very few plants convert enough tools to make this equipment a profitable investment.

When several of these non-standard tools are needed for special production jobs, get the complete tools from the KENNAMETAL plant; when only one or two are required, braze KENNAMETAL formed tips to shanks in your own shop and have the tool on the job cheaper and faster than by reshaping "standards."

Write for your copy of the KENNAMETAL Catalog 43B. It contains detailed information on KENNAMETAL carbide tools and blanks.

KENNAMETAL Inc.

200 LLOYD AVE., LATROBE, PA.

Trade Mark Reg. U. S. Pat. Off.

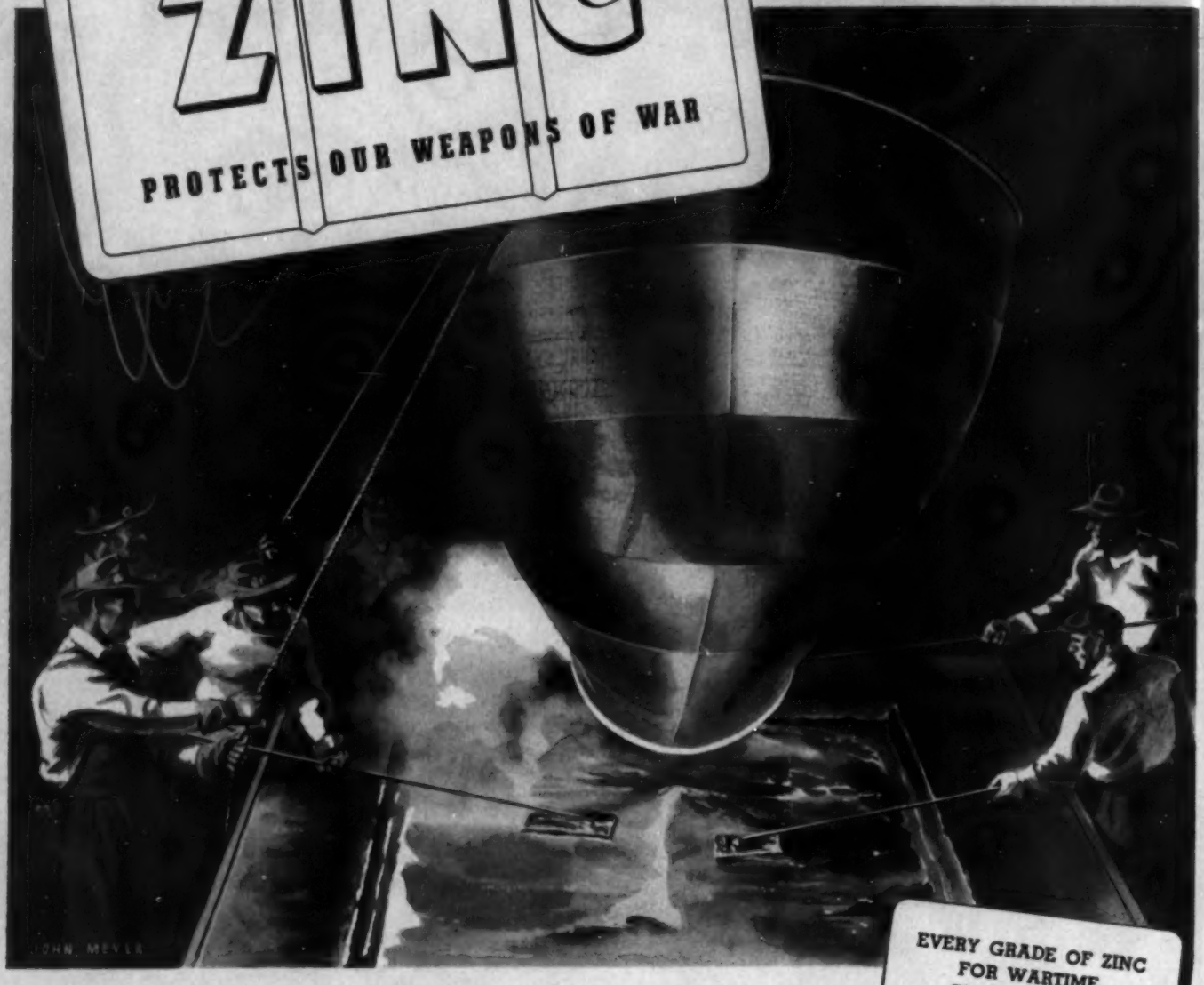
Foreign Sales: U. S. STEEL EXPORT CO., 30 Church St., New York
(Exclusive of Canada and Great Britain)

KENNAMETAL
THE All American CARBIDE

Galvanizing Ventilators for Liberty Ships

ZINC

PROTECTS OUR WEAPONS OF WAR



★ **Wherever iron or steel is exposed to the attacks of rust and corrosion, galvanizing, or zinc coating, offers by far the best protection. Today zinc protects thousands of items of war equipment on land, sea and in the air . . . tomorrow zinc will serve equally well in the protection of thousands of peacetime products.**

EVERY GRADE OF ZINC FOR WARTIME REQUIREMENTS

PRIME WESTERN

SELECT

BRASS SPECIAL

INTERMEDIATE

HIGH GRADE

SPECIAL HIGH GRADE

AMERICAN ZINC SALES COMPANY

Distributors for

AMERICAN ZINC, LEAD & SMELTING CO.

COLUMBUS, OHIO CHICAGO ST. LOUIS NEW YORK

Emergency Steels You Can Trust In ANY Emergency!

CIRCLE Ⓛ National Emergency Cast Steels are "emergency" materials not only in the sense that they save critical alloys—they also possess the quality and integrity to meet the severest tests of operation. All have been approved for production only after measuring up to critical standards based upon the functions each steel is intended to perform.

Lebanon foundry engineers and metallurgists . . . who have had close contact with war production requirements since the beginning . . . will gladly advise you which of these steels fits your requirements. Design, thickness of section, required hardness and shock resistance are always thoroughly studied. The consultation services of these foundry engineers and metallurgists are available upon request to interested organizations.

LEBANON STEEL FOUNDRY, LEBANON, PA.

ORIGINAL AMERICAN LICENSEE GEORGE FISCHER (SWISS CHAMOTTE) METHOD

SEND FOR FREE COPY OF HANDY "MINUTE REFERENCE"

No fumbling...no groping for information! Simply open this *file-size* Lebanon reference chart and the essential facts about Circle Ⓛ National Emergency Cast Steels lie before you—on a single spread. Shows comparative specification designations, nominal analyses, minimum physical properties and heat treatment. The complete chart is available to executives, engineers and metallurgists. Write for your copy.

CARBON STEELS

Lebanon Designation	U. S. Navy Designation	Federal Designation	Emergency ASTM Designation	Similar AISI Type No.	Similar SAE Designation	Similar NE Designation	Nominal Analysis C	Si	Mn	Ni	Cr	Mo
Ⓛ B	49-S-1 (INT) Grade B, C, Cw, D	QQ-S-681b Grade X, 0, 1, 2	EA-A-27-42 Grade B-2 EA-A-215-41 Grade EA-2W EB-W EN-2W EA-A-27-42	1025	1025		.25	.40	.65			
Ⓛ A	49-S-1 (INT) Grade A	QQ-S-681b Grade 3	A-27-39 Grade H	1040	1040		.40	.40	.75	†	†	†
Ⓛ C				1040	1040		.40	.40	.75	†	†	†
Ⓛ D				1040	1040		.40	.40	.75	†	†	†

*NE ALLOY STEELS

Ⓛ 205 (A)	49-S-1 (INT) Grade F	QQ-S-681b Grade 4A-2	EA-A-148-42 Grade A-2			NE8630	.30	.40	.80	.60	.60	.20
Ⓛ 205 (B)		Grade 4C-2	Grade C-4			NE8630	.30	.40	.80	.60	.60	.20
Ⓛ 205 (C)		Grade 4C-3	Grade C-2			NE8630	.30	.40	.80	.60	.60	.20
Ⓛ 205 (D)		Grade 4C-4	Grade C-3			NE8630	.30	.40	.80	.60	.60	.20

† Residual alloys contained.
* Supplied with approval of W.P.B.

NOTE: Other Ⓛ standard grades of alloy steel castings available with proper priority and W.P.B. approval.

LEBANON *Stainless and Special Alloy* STEEL CASTINGS

Giving "BIG BOYS" and "LITTLE TOUGHIES"

the innards to haul the heaviest loads in history

NATIONAL SEAMLESS

Pipe and Tubing

WALLS WITHOUT WELDS

First American War Locomotives to reach Europe. Small in comparison to some of the big locomotives shown here, but they are "army mules" for work. Designed for rough handling and a minimum of repairs. NATIONAL Seamless Tubes used in these locomotives.

From Harrisburg to Chicago with one stop for fuel. These new passenger locomotives are designed for long, fast runs pulling extremely heavy trains. They, too, use NATIONAL Seamless tubes for utmost reliability.

UNITED

Over the great divide. It takes plenty of "umph" to haul long, heavy freights over the Rockies, but these "Big Boys" have the innards to do the job. They use NATIONAL Seamless Boiler Tubes.

IN 1942, American railroads broke all existing records for passenger traffic and freight haulage. Ten months after Pearl Harbor they had hauled *four times* as many troops as they did in the same period of time in World War I. Freight haulage in the first eight months of 1942 jumped 36% in revenue-ton-miles over the same period in 1941. Passenger miles skyrocketed 61%. The estimated total for the whole year is 50 billion passenger miles—the highest total in history!

But these records are expected to be broken again in 1943—for the big push is yet to come. The railroads have shared, too, some of the war burdens of tankers and cargo vessels, helping to move greater quantities of oil, minerals, iron ore, coal and hundreds of other products.

With such a huge task ahead it is obvious that every locomotive will be needed in service every hour possible. Fortunately, many railroads and locomotive builders wisely installed tough, durable, long-lasting NATIONAL Seamless Boiler Tubes and some are getting from 65% to 100% longer service from these tubes. NATIONAL Seamless Pipe has likewise been the dominant choice for the intricate piping systems in most of the finer and larger locomotives and here, too, dependable quality has paid big dividends, especially since the heavy burden of war demands came along.

For hauling the "heavy stuff" railroads have reached a remarkable efficiency. To them belongs unmeasured credit for delivering so much so fast.

NATIONAL TUBE COMPANY

PITTSBURGH, PA.

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* United States Steel Export Company, New York

U S S

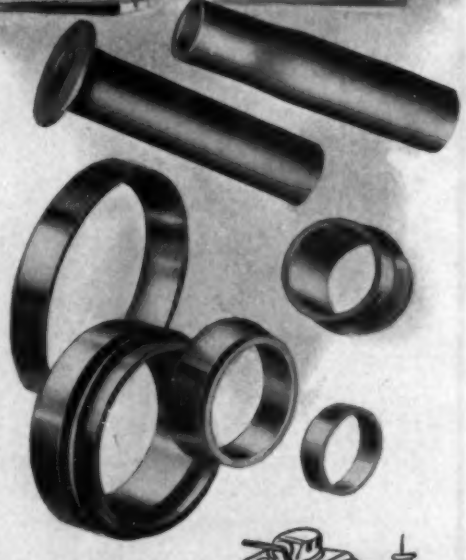
STATES STEEL

use TUBING instead

Seamless Steel Tubing Can Take the Place of Solid Stock for Many Mechanical Parts

Babcock & Wilcox Seamless Steel Tubing for many mechanical uses is fast becoming one of the biggest time savers in war-pressed industry. Why waste labor and machine hours cutting hollow parts from solid sections, when with a minimum of re-tooling a better job can be produced by using seamless steel tubing. The wide range of sizes, types of steel, and its adaptability to machining, makes B&W Tubing especially valuable in speeding production. It is also, obviously, more economical. B&W engineers are always available for consultation on any job where you believe steel tubing might be useful.

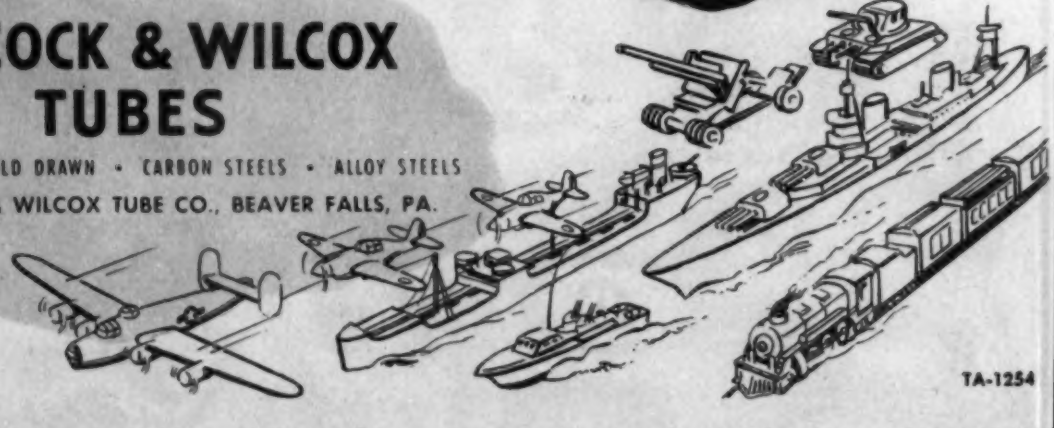
B&W Seamless Steel Tubing comes in a wide range of sizes and types of steel—Carbon Steels, S.A.E. Alloy Steels, and "N.E." Alloy Steels. It can be furnished cold drawn or hot finished, and can be machined, upset, expanded, swaged and spun. Bulletin T-319 tells the whole story. Copy will be sent on request.



BABCOCK & WILCOX TUBES

HOT FINISHED • COLD DRAWN • CARBON STEELS • ALLOY STEELS

THE BABCOCK & WILCOX TUBE CO., BEAVER FALLS, PA.

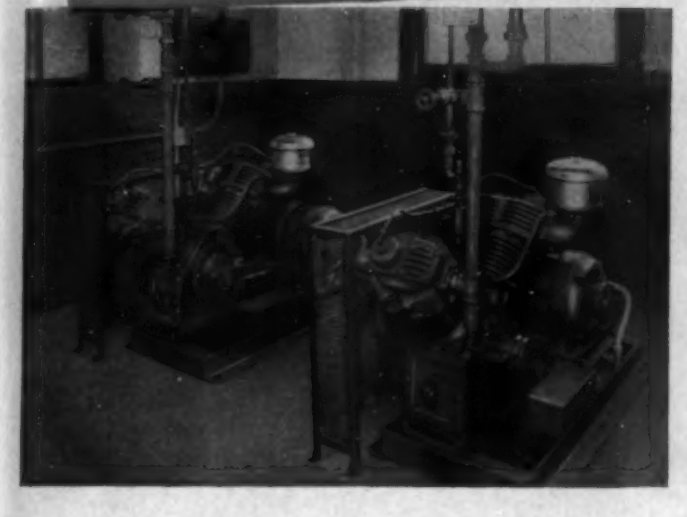


TA-1254

COMPRESSED AIR . . . WHERE YOU WANT IT . . . WHEN YOU WANT IT . . .

WORTHINGTON RADIAL TYPE AIR-COOLED UNITS

READILY PLACED CLOSE TO POINTS WHERE AIR IS NEEDED



Do your expanded activities call for additional compressed air . . . or for air at locations not served by your present equipment? In either case, consider these points in favor of Worthington radial type units:

AIR-COOLED . . . No water piping to install or maintain.

PORTABILITY . . . No foundation required. Can be set up quickly at any convenient place, and moved easily to meet changing needs.

COMPACTNESS . . . Minimum floor space requirements.

RELIABILITY . . . Incorporate the same basic design features as in the larger Worthington compressors . . . assuring years of uninterrupted operation at high efficiency.

District Office Engineers and our Authorized Dealer, in your territory, are ready to assist in selecting the correct type and size of compressor for your particular requirements.

WRITE FOR BULLETIN H-620-B16F.

AC3-8

WORTHINGTON FEATURES

- **FEATHER VALVES.** Considered by leading engineers as the simplest, lightest and most efficient valves ever developed for compressor service.
- **AIRPLANE TYPE CONNECTING RODS.** With balanced radial design, all rods connect to single crankpin bearing, held rigid by four bolts.
- **FORCE-FEED LUBRICATION TO CRANKPIN AND WRISTPIN BEARINGS.** Only filter-cleaned oil reaches bearing surfaces. Saves 50% to 75% of lubrication cost, and extends compressor life by reducing bearing and cylinder wear.
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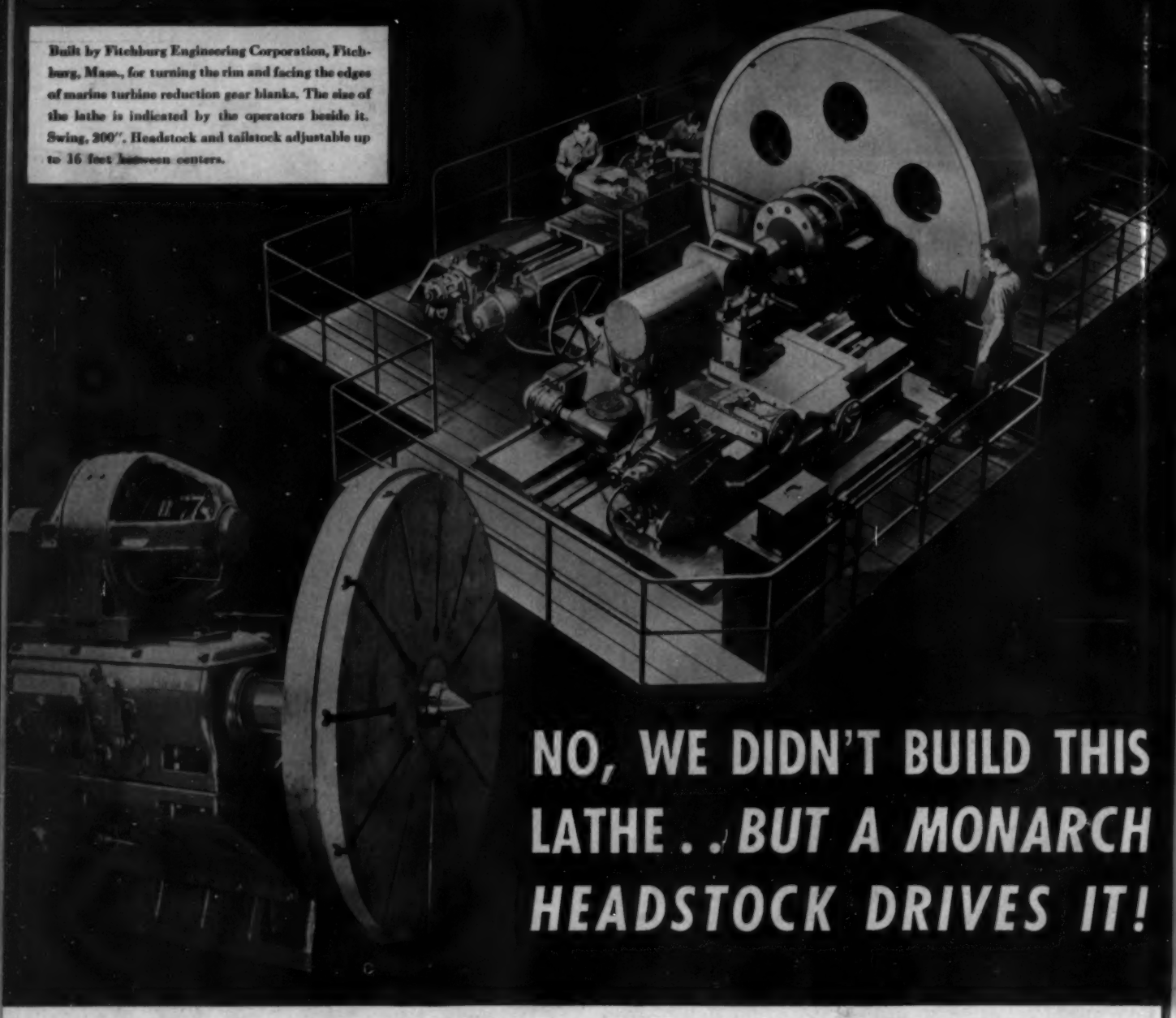

Built by Fitchburg Engineering Corporation, Fitchburg, Mass., for turning the rim and facing the edges of marine turbine reduction gear blanks. The size of the lathe is indicated by the operators beside it. Swing, 200". Headstock and tailstock adjustable up to 16 feet between centers.

NO, WE DIDN'T BUILD THIS LATHE . . . BUT A MONARCH HEADSTOCK DRIVES IT!

Selection of Monarch headstock for this Fitchburg lathe is evidence of the power and dependability of the Monarch mechanism. Its "huskiness" and rigidity amply qualify it for this work, and the 30 hp motor provides plenty of driving power.

Few manufacturers require equipment of this type. However, every user of lathes must be sure that his equipment has the stability, the toughness, the rigidity and the power, combined with unfailing accuracy in performance, to carry out the requirements of his work.

The selection of Monarch lathes, for a wide variety of work in war production, was based upon their proved productivity in peacetime. These same qualities are being maintained and amplified, today.

Manufacturers planning their peacetime operations are invited to consult with Monarch engineers on their lathe requirements.

MONARCH LATHES
Save Time

THE MONARCH MACHINE TOOL COMPANY · SIDNEY · OHIO

Street scene in San Francisco, long the hub of activity on West Coast. Page 82

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STEEL

The Magazine of Metalworking and Metalproducing

AUGUST 16, 1943

Volume 113 — *Number 7*

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★MOBILIZING★
MATERIALS

No. 9 of a series of actual examples of GRAYBAR service, providing electrical materials to be installed in ships, planes and other war products.

When a launching date hung by BASKET WEAVE CABLE...

A shipyard was "stumped" for a quantity of basket-weave electrical cable urgently needed to complete a group of tankers. Unless the cable could be delivered on the job within 24 hours, construction schedules would bog down, launching dates would not be met.

Feverish activity in the yard's purchasing department failed to turn up a single foot of cable. One of their calls went out to GRAYBAR. But even GRAYBAR'S knowledge of cable manufacturers served only to verify that none of the missing "basket-weave" was to be found in stock.

Then Graybar ingenuity swung into action. A call to the GRAYBAR office in a neighboring city revealed that a shipyard there had received a shipment of cable of the type required. Upon explanation of the urgent need, arrangements were made for this customer to "borrow" enough to meet the emergency. Before the one-day deadline was up, the cable reached the job, and construction proceeded according to plan.

This is but a sample of GRAYBAR flexibility in furnishing electrical materials to be installed in ships, planes and ordnance . . . production items as well as construction items. In your day-to-day purchases of electrical supplies, you'll find GRAYBAR equally successful at expediting delivery, at fitting in with your purchasing procedure, at saving buying time all down the line. Why not check with GRAYBAR today?

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STEEL
August 16, 1943

Complacency Begins at Home

No one disputes the possibility that recent developments in the battle zones may shorten the duration of the war. But Washington fears that current favorable news will bring on a wave of over-optimism which will interfere with the war effort. In fact, some authorities already are attributing the lag in certain phases of the war production program to complacency caused by a belief existing in some quarters that victory is just around the corner.

Every sane American will agree that this is no time for a let-down in any part of the war effort. On the contrary, now is the time when a real all-out performance would be most effective. The logical time to hit hardest is when the opponent is on the ropes.

Unfortunately, this nation has not yet and will not now hit as hard as it could or should hit. It will continue to fight "under wraps", so to speak, because we have not learned the meaning of real "all-out" production. We have not learned it because our government itself has not demonstrated that it is solidly in favor of "all-out" production.

If our government were sincerely concerned about "all-out" production, it would set an inspiring example of unified all-out zeal for war in the government agencies. It has not set this example. Nor can it set such an example as long as it continues to permit about a million of its civilian employes to pursue nonwar boondoggling activities in wartime, as long as it allows our vice president to go barnstorming about the country trying to pick synthetic fights with American business, as long as its attorney general interprets the anti-strike law passed by Congress so as to encourage stoppages of war work and as long as almost every agency in government spends a sizable portion of its time and effort trying to undo the work of other agencies.

When a government spokesman tells us war output is lagging because we are too optimistic about encouraging war news, he doubtless is speaking honestly and sincerely. But, unconsciously, he is using a doubtful alibi which cloaks the greater menace of the continued apathy of numerous government agencies and bureaus toward the war effort.

Complacency born of favorable war news is nothing compared with complacency arising from the miserable example set by our government.

WAR ACCENTUATES TREND: In reading the series of articles on developments in the Pacific Coast states, the first of which appears in this issue, it will be well to keep in mind as background information the fact that the so-called "second gold rush" is not 100 per cent a war condition.

A definite, strong, upward trend in population and in industrial expansion on the West Coast was in progress long before the war started. In the two decades from 1920 to 1940, the population of California, Oregon and Washington increased 75 per cent compared with a gain of only 25 per cent for the entire country. Industrial activity in the Pacific area expanded more rapidly after the depression than in many other industrial sections of the nation. Thus, the terrific spurt resulting from the war—while spectacular and impressive—in reality is an intensification of a strong movement which had been in progress for some time.

The pertinent question now is to what extent the experience gained by West Coast industrialists in their airplane, shipbuilding and light metal contribu-

(OVER)

tions to the war effort can be put to effective use in manufacturing peacetime products. In short, what margin of benefit will accrue from the war, over and above the gains already assured by the long-term trend of growth on the West Coast? —p. 82

• • •

TO PREVENT SCORING: Now that it is common practice to machine some parts of machines to extremely close tolerances, it is more than ever disconcerting to a machinery or equipment builder to find that dirt or grit loosened from the inside of a housing has found its way into gears or onto highly finished surfaces and has scored them.

One machine tool builder has practically eliminated this difficulty by flushing out all parts of his machine tools with oil under 40 pounds pressure. After 15 minutes of flushing, the flushing oil is drained off and clean machine oil is applied to all moving parts and interior surfaces. The machine is kept in operation during the application of the flushing and machine oils.

This simple but effective precaution against damage to highly finished parts and surfaces can be used to advantage not only by the builders of machines and equipment, but also by many users of precision machinery. —p. 98

• • •

SPREADING WAR WORK: Government agencies are launching a new drive to distribute war work more widely. The objective is threefold—first, to increase output; second, to shift more orders to areas where manpower shortages do not exist; and third, to place new orders in shops where machines and manpower have been released by cutbacks or cancellations of old war contracts.

The move is a renewed attempt to distribute work according to the ability or capacity to handle it. It is a logical step, but one in which success can be achieved only by mastery of intricate detail.

—p. 59

• • •

UNCLE SAM'S PLANTS: In a short time this nation will have capacity for producing 2,100,000,000 pounds of aluminum annually. About half of this capacity will be in plants owned by the government and operated by the Aluminum Co. of America, a third will come from plants owned and operated by this leading private producer and the remainder—a sixth—will be in publicly or privately owned plants operated by other private producers.

This means that well over half of the aluminum capacity will be owned by the government. A somewhat similar situation will exist in connection with capacity for some other materials such as chemicals, explosives, synthetic rubber, etc.

On the other hand it is estimated that when the present steel expansion program is completed (75 per cent completed now) only about 7 per cent of the steel capacity will be government-owned.

On the basis of these figures, the steel industry should experience less difficulty in postwar adjustments in ownership than some other important industries. —pp. 60, 70

• • •

STEEL FOR HOME FRONT: On the basis of present figures, the chances of diverting steel to civilian needs before sometime next year appear to be pretty slim. Claimant agencies have asked for 4,000,000 more tons of carbon steel for the fourth-quarter than will be available. The railroads will be allocated some material in that quarter, but little tonnage will be forthcoming for other essential nonwar uses.

This continued tight situation in steel in the face of unprecedented production arises chiefly from the tremendous demand for direct war and lend-lease shipments. The situation causes the military authorities to challenge sharply every request for steel for nonwar use.

Those in Washington who see the need of keeping the home economy in working order cannot argue too strongly against the military experts. For one thing, figures show that the people at home have fared pretty well during the war. Consumer expenditures of the public were 62 billion dollars in 1939, 65 billion in 1940, 70 billion in 1941 and 69.6 billion in 1942.

These figures, of course, are not conclusive evidence of the need of civilian steel, but they do show that the civilian standard of living is high for a nation supposed to be all-out for war. —pp. 58, 69

E. L. Shaner

EDITOR-IN-CHIEF

There are many types of employment open to women — machine operation, welding, stenography, laboratory work, etc. The need is so great that a woman should be able to find exactly the type of work for which she is best suited.

Perhaps Joan Could Help, Too!

Have you stopped to consider there is a place for your sister, your daughter—yes, even your wife—in the great effort the metal working industry is making to help win this war?

Through your everyday conversation the women in your family realize the need for more production. They know about the shortage of workers. They know that it is patriotic to work, but because their place has been in the home, many of them are timid about going to work in an office or factory.

You, as a worker in America's great metal industry, can dispel that timidity by telling them about the many kinds of jobs open to women. Let them know that they are as safe in the factory as in the home; that modern American factories are clean; and that factory associations are interesting.

Talk to Joan, Helen, Barbara this evening. In years to come they will be proud of the work they did to help keep America's homes safe and free.

ARMY E NAVY

Check your local help wanted ads for specific needs in your area, or ask the local U. S. Employment Service.

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RYERSON STEEL-SERVICE

WAR PUTS PRESSURE ON BARS

Most versatile of products head consumption list in first half of 1943. . . Even faster pace in prospect with demand in most directions unabated

This 14-inch mill rolls steel bars which are leading other steel products in their application to the war effort. Flats, angles, and tees are also rolled on this same mill

By B. K. PRICE
Associate Editor, STEEL

THE MOST versatile of heavy rolled steel products, bars, tonnagewise, are currently heading all steel products in their application to the war effort. At the end of the first half of this year they were even running slightly ahead of plates, whose performance has been little short of sensational. Bars have maintained this fast pace despite drastic decline in reinforcing steel production in recent months.

Last year, out of a total of approximately 12,400,000 tons of bars, reinforcing steel accounted for 1,800,000 tons, but in the first six months of this year output fell to about 260,000 tons, for an average of approximately 43,000 tons monthly, and a further drop is in prospect. Until a week or so ago at least, certain large producers had less than 100 tons of reinforcing bars scheduled for September rolling. Trade predictions now are that reinforcing steel output this year will not exceed 400,000 tons, if that. This decline in reinforcing bars, of course, is due to the completion of much highly rated war construction and the rigid restrictions on construction of all other character.

Meanwhile, plates, if anything, are going to be required on an increasing scale. In the first half about 6,400,000 tons were produced, or at a rate of 12,800,000 tons annually, and with the ship program still expanding it may run even a shade higher.

By way of a memorandum, plates are by far the major steel item in ship construction with shapes a poor second and bars third.

On the basis of overall performance since this country entered the war, bars are lagging behind plates. In 1942, the full year of participation, bars fell substantially behind plates, after the latter's sensational rise from the year before, which was made possible not only through increased plate mill capacity, but more importantly through the diversion of continuous strip mill capacity to the production of plates.

Draws Comparative 1941 Figures

In 1941, plate production, as reported to the American Iron and Steel Institute by companies producing more than 97 per cent of the country's ingot production, amounted to 5,890,837 tons; bar output, 11,170,095 tons. Interestingly, sheet and strip production in that year, as reported by these same companies, reached a total of 16,662,039 tons, and shapes, the fourth major steel item, 4,960,822 tons. Last year (1942), sheet and strip production, it is reliably estimated fell to around 11,000,000 tons, while shapes increased 200,000 or 300,000 tons.

To go back to the outbreak of the war in Europe in September, 1939, it is interesting to note that in 1940, according to figures submitted to the institute by companies representing more than 98 per cent of the year's steel output, bar output was 7,863,990 tons, plates 4,085,791 tons, sheets and strip 12,841,931 tons and shapes 3,366,475 tons; and that in 1939, as reported by companies with more than 95 per cent of steel capacity, bar production was 6,319,263 tons, plates 2,817,107 tons, sheets and strip 10,764,778 tons, and shapes 2,544,515 tons.

Thus it is seen, and with such indications as are available for 1943, that bars and plates have gained appreciably, with bars as well as plates probably gaining somewhat this year despite the drop in reinforcing bar output; that sheets and strip soared in 1941, only to drop sharply last year, but probably make a modest gain this year; and that shapes increased steadily, with a substantial decline in prospect for the current 12-month period.

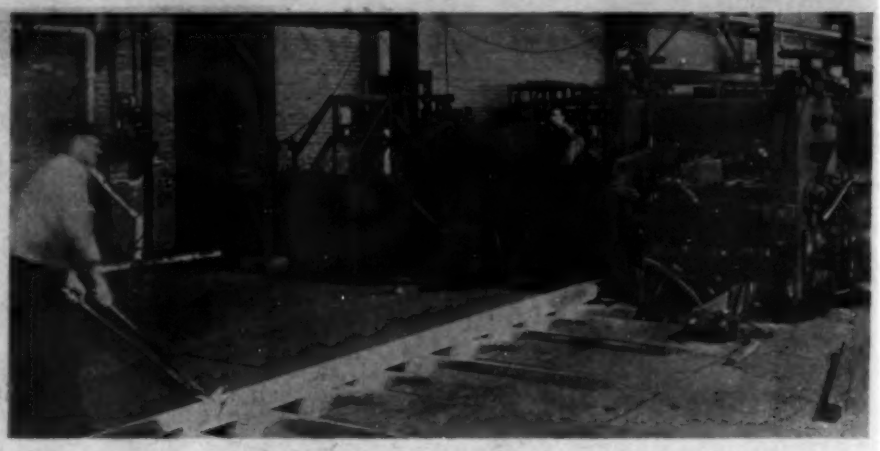
But to focus particularly on bars: First, since the end of 1941, when this country entered the war, capacity has increased from around 12,700,000 tons to 14,700,000 tons, a figure, interestingly, closely comparable with the capacity in 1933, ten years ago. This increase of the past year and a half of 2,000,000 tons is attributed to several factors. Certain new units have been installed, perhaps par-

ticularly to meet the sharp increase in demand for alloys. Incidentally, some new capacity is still to be brought in. Moreover, some mills which had become regarded as antiquated have been brought into use, and there has been some conversion of structural and rail capacity to bars.

At present the greatest bottleneck is in the larger specifications—rounds 3 inches and up and heavy flats. Much of the larger round tonnage goes into shells, with certain of the larger sizes for this purpose really falling into the billet category.

Also a particularly tight situation has prevailed in cold-drawn bars, with production of cold-drawn carbon bars alone in the first six months of the year running close to 900,000 tons, which was about the estimated capacity in 1940. Last year, it is estimated that production of cold-drawn bars both carbon and alloy, exceeded 1,600,000 tons, compared with more than 1,400,000 in 1941, and this year a new peak appears assured.

Bessemer steel has been drawn upon to some extent to relieve the situation in open hearth steel, and only last spring the War Department revised many of its specifications so that bessemer could be used more freely for shell components and other items. Cold-drawn bar producers were given larger quotas of hot steel, provided they could take it in bessemer and jobbers benefitted by this freer policy. The Navy, in the main, has held more rigidly to its original specifications, although the Maritime Commission has permitted the more liberal use of bessemer above decks, for radio shacks, runways, handrails, and other purposes for which bars as well as sheets and wire are used.



This view shows the entrance side of the 16-inch rougher at the Lackawanna plant of the Bethlehem Steel Co.

Alloy bar demand since the beginning of the war has represented more of an addition to than a shift from the carbon grades in the opinion of trade leaders. Where a shift has really been made, they declare, has been in the change from the higher alloys to the leaner NE steels. It is reliably estimated that the NE steels now represent substantially more than 50 per cent of the alloy bars being consumed, with the percentage in bars, incidentally, being perhaps a little higher than in most other products.

Processors Large Bar Users

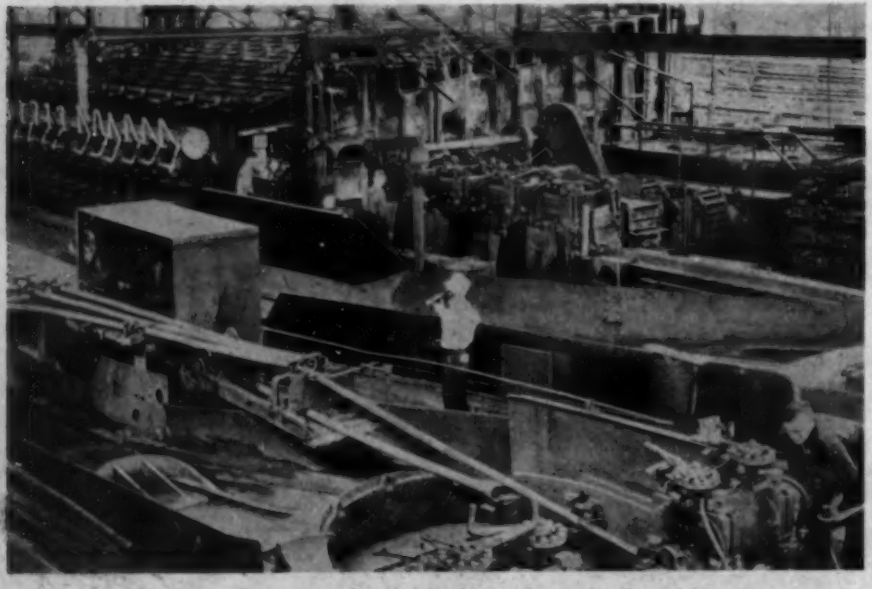
One of the consistently large outlets for bars has always been the converting and processing industries, such as the forgers, bolt and nut manufacturers and wire drawers. In 1941 this group took more than 2,000,000 tons, only to take possibly 200,000 tons still more last year, and then to carry on so far this year at a still higher rate of consumption.

However, after eliminating this and various other outstanding groups, there remain many miscellaneous outlets which in the aggregate consume a large total and which combined with exports, on which figures are now censored, comprise today perhaps the largest single classification. Last year this group accounted for close to 3,000,000 tons, compared with more than 1,400,000 in the preceding year. Carbon bars comprise the bulk of this tonnage, as is usually the case, but the percentage of alloy bars to the total in this miscellaneous and export classification is unusually high.

Up to this year, owing to the heavy demand for reinforcing bars, the construction industry has been an important major outlet. Last year close to 2,000,000 tons were taken, against 1,800,000 the year before. In both years far more than half were reinforcing bars, so with the sharp drop this year in demand for reinforcing steel, to say nothing of the overall drop in construction, this industry as a consumer of bars should fall well down the list.

When the automobile industry stopped making pleasure cars early in 1942, the effect on bars soon became evident. In 1941 the automotive and aircraft industries combined took around 1,800,000 tons, according to the American Iron and Steel Institute. The following year, however, saw a drop of almost 1,000,000 tons, it is estimated, as needs of the group centered principally on aircraft. At the same time, the ratio of alloy bars to carbon, which was in rather close balance in 1941, increased to a point where more alloy tonnage was being consumed than carbon.

With still further emphasis on aircraft this year this trend is likely to be further reflected, and the overall tonnage for the group is likely to be larger, because of the expansion in aircraft which now for



Observer takes the temperatures as bars are rolled on the 10-inch mill at the Johnstown, Pa., plant of Bethlehem Steel Co. Photos by courtesy of Bethlehem Steel Co.

the past many months has dominated this particular classification. Needless to say, once the war is over and the automobile industry assumes normal life, the flow of bars in this general channel will greatly increase, despite the letdown in aircraft construction.

While ship requirements increased almost 200 per cent last year to more than 600,000 tons, and are still climbing, machine tool needs have tapered. In 1941, the total was around 650,000 tons, dropping to approximately 500,000 tons last year and, apparently, is still on the decline. The trend in railroad equipment needs likewise has been downward, owing to wartime limitations on cars and locomotives for domestic lines. Last year bar requirements were off perhaps 200,000 tons from the 550,000 tons or so of the preceding year. However, substantial lend-lease purchases, especially of locomotives, is believed to have caused some leveling off in the trend this year. Accumulated needs of domestic carriers are expected to bolster demand after the war.

While running a poor third in the shipbuilding industry, bars have been moving in substantially heavier volume for ship work. Last year the tonnage is estimated to have been around 650,000 tons, against more than 225,000 tons in 1941, and this year with the ship program still expanding, a new peak in bar consumption for this work is expected.

As previously indicated, a new peak this year in cold-drawn bars is virtually assured—despite a possible further decline in tonnage to warehouses and machine tool builders. Last year there was an appreciable drop in both instances, although some estimate that this year there may not be as much of a decline in tonnage going to jobbers as to machine tool builders.

Present, Past and Pending

■ TIMKEN PRODUCING OVER 6000 GUN BARRELS A MONTH

CANTON, O.—Timken Roller Bearing Co. is manufacturing over 6000 gun barrels a month for .75 and .40 millimeter guns, in place of the 300 barrels a month considered good production at the outbreak of war. Present output is made possible by use of seamless steel tubing and a newly perfected Timken process.

• • •

■ AIRCRAFT PLANTS NEED 700,000 NEW WORKERS IN YEAR

WASHINGTON—The aircraft industry will require 700,000 new employes in the next twelve months, according to a survey by Bernard M. Baruch, special adviser to War Mobilization Director James F. Byrnes. Main difficulty has not been the draft, but employes' quitting jobs for various reasons.

• • •

■ DPC LOANS REPUBLIC $500,000 FOR SPONGE-IRON PROGRAM

WASHINGTON—War Production Board has authorized Defense Plant Corp. to loan $500,000 to Republic Steel Corp. for continuance of its efforts to make sponge iron at Warren, O., by the Brassert-Cope process (STEEL, Dec. 7 issue). First sum used for this program was $450,000.

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■ AMERICAN, BALDWIN, LIMA BUILD INVASION LOCOMOTIVES

NEW YORK—American Locomotive Co., Baldwin Locomotive Works, and Lima Locomotive Works have been ordered to halt tank construction so they can build 900 locomotives required for military invasion purposes, says WPB. Though work is expected to be completed in third quarter, necessary 60,000 tons of sheared plates have not yet been allocated.

• • •

■ G-E TURBINE PRODUCTION SEVEN TIMES THAT OF 1941

SCHENECTADY—During 1943 the General Electric Co. will produce steam turbine propulsion equipment for the Navy and Maritime Commission with a total capacity of 11,000,000 horsepower, or seven and a third times more than was manufactured in 1941. These modern turbines have a fuel consumption rate 25 to 40 per cent less than those for the same type of vessels in World War I.

• • •

■ STEEL INDUSTRY EMPLOYS THOUSANDS OF WOMEN

NEW YORK—Almost 37,000 women now are working in steel plants, according to the American Iron and Steel Institute. In addition, approximately 27,000 women are employed in steel company offices. Women account for about one-tenth of total employes in the steel industry.

• • •

■ STEEL MILLS PROVIDE HUGE FREIGHT TONNAGE

NEW YORK—Almost one out of every four tons of freight hauled by American railroads in 1942 consisted of either raw materials for steel mills or was steel shipped from the mill to the war industries. Railroad freight going to and from steel plants filled nearly 6,400,000 cars.

• • •

■ NEW CARGO PLANE AS EASY TO LOAD OR UNLOAD AS VAN

BALTIMORE—A cargo plane which can be loaded and unloaded as easily as a motor van is announced by the Glenn L. Martin Co. for postwar service. Radically new features include a loading door under the tail surfaces; a collapsible ramp running to the ground or direct to a truck; built-in winches, and adjustable jacks for relief of strains on the plane itself.

Metal Producers Allowed Advance Premium Payments

Producers operating "zero quota" properties under the premium price plan for copper, lead and zinc, may obtain, in addition to the base price for ore and concentrates, from the smelter an advance of 90 per cent of the premium payable on their "zero quota" production, effective on August deliveries. Advance payments will be paid by various smelters and mills acting as agents for Metals Reserve Co. under the premium price plan.

Scrap Dealers To Buy MRO Supplies Under P-136

Use of preference ratings by scrap metal processors for maintenance, repairs, and operating supplies is now controlled by order P-136 instead of CMP regulation No. 5. Order P-136, as revised, now provides in part that processors must obtain a certificate and serial number before they are eligible to use the AA-2 priority rating for the purchase of MRO supplies. It restricts minor capital additions obtainable under the order to $250.

Steel Landing Mats Made Of 10-Gage Strip

In the story on steel landing mats appearing on page 112 of the Aug. 9 issue of STEEL it was incorrectly stated that quarter-inch plate is used in the production of these mats. These landing mats actually are fabricated from 10-gage strip steel.

Optimist: A Man Who Anticipates More Steel for Home Front Soon

OCR does not intend to reopen substantial manufacture of consumer items, says WPB Vice Chairman Whiteside, but will meet minimum essential needs. . . Shortage of critical metals against fourth-quarter requests is reported

INCREASED allotments of critical metals for manufacture of civilian goods seem to be out of the question for at least the remainder of 1943. This contradiction of a current belief is justified by the prevailing war materials situation and the War Production Board viewpoint predicated on those circumstances. To summarize, the conditions are:

Carbon steel requests from claimant agencies for the fourth quarter total 4,000,000 tons more than the available supply. These include 940,000 tons of rails and other maintenance necessities for the nation's railroads. Output of munitions and aircraft is lagging. War fronts are all going strong—but the production sector back home is not providing what it takes to win wars.

Total requests from claimant agencies for carbon steel for use during fourth quarter amount to slightly more than 19,500,000 tons compared with an estimated supply of a little under 15,500,000, representing a deficit of about one-fifth.

Requests of the Army, Navy, Aircraft Resources Control Office and Maritime Commission for carbon steel, taken together, were reduced by about 9 per cent in the allotments just made by the Requirements Committee, War Production Board. All other requests, including those for export, were reduced about 17 per cent. The steel allotments are final and the committee will not, as in the past, entertain requests for supplemental quantities during the quarter.

Fourth quarter allotments of controlled materials, made it clear that military and essential civilian demand for other critical metals also continues to outrun available supplies.

"Although carbon steel supplies were the controlling factor in making allotments of copper, aluminum, and alloy steel, the latter are still extremely tight," Donald M. Nelson, WPB chairman, said last week. "Copper production particularly, is adversely affected by current serious manpower shortages."

The fourth quarter "pie" was divided among the 16 claimant agencies representing military and civilian requirements, lend-lease and other exports. More realistic production programming is reflected by the fact that the overall reduction of the claimants' requests amounted to only 13 per cent, J. A. Krug, chairman of the Requirements Committee, pointed out. In making third quarter allotments last spring, it was necessary to lop off a total of 25 per cent to keep production schedules within available supplies.

Office of Civilian Requirements received a somewhat larger allotment than was made for its purposes in the third quarter, and an earmarked account in the lend-lease allotment is reserved for the manufacture of farm machinery to be used as needed by the Office of Foreign Relief and Rehabilitation in occupied countries.

"In the face of such shortages, the degree of essentiality of an individual product, whether it be a gun or a cook stove, is the measure by which allocations of critical materials are made," Mr. Nelson said.

"It is of equal importance to maintain the health and welfare of the soldier on the fighting front and the worker on the home front. Production of goods for both is the responsibility of the War Production Board."

It is the function of the Army, Navy, Office of Civilian Requirements and other claimant agencies to determine the quantities of their programs. These determinations are matched against each other by the Requirements Committee which determines the essentials.

"That is the basis of the program," Mr. Nelson continued. "If it becomes necessary to produce a given quantity of cook stoves or farm machinery or whatever, to maintain civilian health and welfare, we are going to produce them regardless of the scarcity of the materials involved.

"That is the policy of the War Production Board and a policy with which the leaders of the interested agencies of government are in complete agreement. We have no intention of deviating from it."

Reflection of this policy is found in WPB Vice Chairman Arthur D. Whiteside's statement regarding the tentative program presented by the Office of Civilian Requirements for production of essential consumer goods. Because of critical materials required, OCR does not intend to reopen substantial manufacture of many civilian items, said Mr. Whiteside. He continued:

"By wise use of about the same quantities of materials that have been made available for civilian production during recent months, essential civilian services and the production of essential civilian goods can be maintained. The needs of the war at present permit no other course

"The civilians of this country realize that a continuing drop in the quantities of goods which formerly made up their standard of living must be expected during a total war, and that every possible resource must be directed toward military victory. Our objective is to provide the

(*Please turn to Page* 137)

ARTHUR D. WHITESIDE
Seeks to aid civilian economy without hampering military effort

AUTO REPAIR PARTS

Sufficient new and reconditioned automotive parts will be made available to keep the nation's essential automobiles rolling through 1944, War Production Board said last week. Even the country's 5,000,000 vehicles 10 years and older will be provided for in the parts replacement program.

A portion of this supply will originate with scrap dealers and auto wreckers who must save usable or reconditionable parts from cars which they dismantle. Buyers of new or reconditioned parts must turn in the corresponding part being replaced.

Production of over $400,000,000 worth of new parts for civilian cars a year will be in addition to the automotive industry's huge output of military goods which reached an annual rate in June of $8,700,000,000.

Moves Initiated To Spread Out Available Work

Government agencies ask prime contractors to subcontract in less critical labor areas. . . Tool builders discuss conversion

BROADER distribution of available war work in an effort not only to step up output to meet projected production schedules, but also to utilize as far as possible facilities of shops which have been adversely affected by contract cutbacks and cancellation of orders, is seen in moves being initiated by the various government agencies.

Last week, due to the increasing shortage of manpower in certain critical areas, approximately 1000 prime contractors with order backlogs totaling $5,000,000 or more each were requested to place subcontracts for fabrication of products in the less critical war areas. The request, which was called "vital to the war effort," was contained in a letter signed by Chairman Donald Nelson of the War Production Board, Chairman Land of the Maritime Commission, Under Secretary of War Patterson, Under Secretary of Navy Forrestal and Clifton Mack, director of the Procurement Division, Treasury Department.

In effect the letter urged prime contractors to follow the same policy in placing subcontracts which the federal government observes in placing prime contracts. For months federal agencies have been making every effort to place prime contracts in non-critical labor areas.

Manufacturing industry has been affected over a wide area in recent months through the cancellation of numerous Army contracts; these cancellations stemming from changes necessitated by developments on the battle fronts. Within the past ten days cancellation of a $60,000,000 order for tanks was disclosed by the War Department. Brig. Gen. Albert J. Browning said this was one of the largest contract terminations which the War Department had ordered, but he withheld details. Nearly 5000 subcontracts were involved in this cancellation.

Further contract cancellations and cutbacks are expected as the war proceeds, though it is not indicated that any sharp or radical additional revisions are now in prospect.

Indicative of what is being done to meet the situation resulting from the cancellation of contracts, the Machine Tool Industry Advisory Committee of the Tools Division, War Production Board, at its meeting in Washington last week discussed plans for conversion of unused machine tool capacity to the production of other war material with a minimum expenditure of additional machine and manhours.

ALL-STEEL CARTRIDGE: Fast dwindling stock piles of brass necessitated redesigning cartridge cases using steel as a substitute. Here Howard Kulas, vice president in charge of operations, Mullins Mfg. Corp., Salem, O., is shown left inspecting the new cases with Harry Heckathorn, vice president at the Youngstown Pressed Steel Division, Mullins Mfg. Corp., Warren, O. The new all-steel cartridge is in mass production for the Army

Discuss Direct War Items

The meeting brought out that production of direct war items by the industry could not be expected to approach the difference between its machine tool production rate in 1944 and its maximum rate, as the maximum rate was made possible by a substantial volume of subcontracting and by high production of its items for which the equipment and skills of each plant were best adapted.

The committee recommended that a subcommittee be appointed to report further at an early date on the level of operation to be expected from the machine tool industry in production of machine tools and of war goods during coming months.

The operation of WPB directive 23, requiring the screening of preference rating certificates for machine tools in regional and district WPB offices, was reviewed, as this important regulation is designed to get existing machine tools into use and to hold down expenditure of additional machine and manhours for new equipment.

The present net new order position in the machine tool industry ran only slightly more than one-third of shipments for the month of June, the committee was informed. It is recognized that the majority of unfilled orders should be produced and shipped at the earliest possible date with consequent rapid reduction in shipments expected as the year draws to a close.

The effect on machine tool production of the discontinuance of pool orders, which were a substantial factor in providing adequate supplies of machine tools during the period of peak needs, was considered by the meeting. Issuance of new pool orders for machine tools has been discontinued following a recent policy decision by the armed services and WPB. It was emphasized by committee members that discontinuance of such orders would inevitably force down production, as machine tool builders without pool orders will be forced to operate within their firm order pattern.

Reports were given on expected programs and there was considerable discussion as to the extent of possible retooling of present programs to save manhours and the probable extent of economical replacement of old equipment with new in war production.

Nelson Reports Iron and Steel Expansion 75 Per Cent Complete

Greatest advance revealed in construction of plants producing finished munitions. . . No lag in raw materials program. . . Largest percentage gain registered in plant expansion for high-octane gas

PROJECTED war plant expansion program in the iron and steel industry was 75 per cent complete on July 1, Donald M. Nelson, chairman, War Production Board reports. Seven of the plants are being rushed to completion this year and these alone represent about 33 per cent of the entire program.

The showing in iron and steel is considered one of the most encouraging aspects of federally financed war plant construction, especially in view of the supply difficulties which hampered construction almost from the inception of the undertaking.

Mr. Nelson's report also revealed that the nation's gigantic government financed war plant construction program was more than 80 per cent complete at midyear. Out of the current $14,582,000,000 appropriated by the government for war plants, about $12,038,000,000 was spent by the end of June.

Mr. Nelson said that in June, 1942, the program was only 34 per cent complete and in January 1943, about 61 per cent. The midyear mark saw the greatest accomplishment in construction of plants to produce finished munitions such as guns, combat vehicles, aircraft, ships and ammunition. Facilities for production of ammunition and explosives were 95 per cent completed.

Raw Materials Program Gains

Construction and equipment of plants to produce raw materials, such as synthetic rubber and steel, was fast catching up after earlier tendencies to lag. The synthetic rubber facilities program was about 3 per cent finished a year ago, about 15 per cent completed in January, 1943, and by July 1 of this year was 61 per cent completed. Chairman Nelson pointed out that only since the beginning of this year has the raw materials facilities program passed the half way mark.

Largest percentage of gain in the first half of the year was registered by plants to produce 100-octane gasoline. At the beginning of the year, less than 1 per cent of the government-financed program was installed but by July 1 the program was 39 per cent complete. High octane gasoline plants have been granted high preference ratings and steady increases in the program may be expected over the remaining months of the year. Greater progress has been made in the privately financed high-octane program where 63 per cent was reported completed by July 1.

Allegheny-Ludlum Acquires C. B. S. Steel & Forge Co.

Chairman William F. Detwiler of the Allegheny Ludlum Steel Corp., Pittsburgh, last week announced acquisition of C. B. S. Steel & Forge Co., Los Angeles.

"Effective Aug. 1, 1943," said Mr. Detwiler, "the plant will be operated as the Los Angeles division, Allegheny Ludlum Steel Corp. under the supervision of J. H. Spade, Los Angeles manager.

"The new plant," he said, "will take care of Allegheny Ludlum's expanding business on the West Coast. It is now operating close to capacity, and its facilities will be expanded as required for the production of special stainless, heat and corrosion resisting steels and tool steel products."

July Ingot Output Above Same Month Last Year

Steel ingot and castings production in July rose to a total of 7,376,017 net tons, compared with 7,027,101 tons in June, but remained below tonnage produced in the preceding 31-day months of 1943, the American Iron and Steel Institute reports.

July output, however, was substantially greater than that of July, 1942, when 7,144,958 tons were produced.

In the first seven months a total of 51,-

STEEL INGOT STATISTICS

	Estimated Production—All Companies								Calculated weekly production, all companies Net tons	Number of weeks in mo.
	—Open Hearth—		—Bessemer—		—Electric—		—Total—			
	Net tons	Per cent of capac.	Net tons	Per cent of capac.	Net tons	Per cent of capac.	Net tons	Per cent of capac.		
Based on Reports by Companies which in 1942 made 98.3% of the Open Hearth, 100% of the Bessemer and 87.6% of the Electric Ingot and Steel for Castings Production										
1943										
Jan.	6,576,589	97.8	478,058	85.9	369,395	95.4	7,424,042	96.8	1,675,856	4.43
Feb.	6,033,674	99.3	447,843	89.1	344,532	98.6	6,826,049	98.5	1,706,512	4.00
March	6,785,295	100.9	503,673	90.5	381,219	98.5	7,670,187	100.0	1,731,419	4.43
1st qtr	19,395,558	99.3	1,429,574	88.4	1,095,146	97.5	21,920,278	98.4	1,704,532	12.86
April	6,509,812	99.9	481,810	89.4	382,532	102.1	7,374,154	99.3	1,718,917	4.29
May	6,664,298	99.1	483,024	86.8	398,057	102.9	7,545,379	98.4	1,703,246	4.43
June	6,188,857	95.0	453,399	84.1	384,645	102.6	7,027,101	94.6	1,638,019	4.29
2nd qtr	19,362,967	98.0	1,418,433	86.7	1,165,234	102.5	21,946,634	97.4	1,686,905	13.01
1st hlf	38,758,525	98.7	2,848,007	87.6	2,260,380	100.0	43,866,912	97.9	1,695,667	25.87
July	6,516,387	97.1	466,288	83.9	393,342	101.9	7,376,017	96.4	1,668,782	4.42
Based on Reports by Companies which in 1942 made 98.3% of the Open Hearth, 100% of the Bessemer and 87.6% of the Electric Ingot and Steel for Castings Production										
1942										
Jan.	6,322,215	95.3	490,874	86.0	299,017	94.2	7,112,106	94.5	1,605,442	4.43
Feb.	5,785,918	96.6	453,549	88.0	273,068	95.2	6,512,535	95.9	1,628,134	4.00
March	6,572,930	99.0	493,191	86.4	325,990	102.7	7,392,111	98.2	1,668,648	4.43
1st qtr	18,681,063	97.0	1,437,614	86.7	898,075	97.4	21,016,752	96.2	1,634,273	12.86
April	6,345,133	98.7	454,834	82.2	321,324	104.5	7,121,291	97.7	1,659,975	4.29
May	6,595,440	99.4	453,938	79.5	333,200	104.9	7,382,578	98.1	1,666,496	4.43
June	6,239,674	97.1	452,528	81.8	323,100	105.1	7,015,302	96.3	1,635,269	4.29
2nd qtr	19,180,247	98.4	1,361,300	81.2	977,624	104.8	21,519,171	97.4	1,654,049	13.01
1st hlf	37,861,310	97.7	2,798,914	83.9	1,875,699	101.1	42,535,923	96.8	1,644,218	25.87
July	6,345,315	95.7	453,686	79.6	345,957	96.6	7,144,958	94.5	1,616,506	4.42
Aug.	6,414,637	96.5	467,293	81.8	345,725	96.3	7,227,655	95.4	1,631,525	4.43
Sept.	6,286,855	97.9	437,961	79.4	332,703	95.9	7,057,519	96.4	1,648,953	4.28
3rd qtr	19,046,807	96.7	1,358,940	80.3	1,024,385	96.3	21,430,132	95.4	1,632,150	13.13
9 mos.	56,908,117	97.3	4,157,854	82.7	2,900,084	99.4	63,966,055	96.3	1,640,155	39.00
Oct.	6,750,829	101.5	461,897	80.9	366,788	102.2	7,579,514	100.0	1,710,951	4.43
Nov.	6,371,750	99.0	458,469	82.9	349,593	100.5	7,179,812	97.8	1,673,616	4.29
Dec.	6,471,261	97.6	475,204	83.4	358,075	100.0	7,304,540	96.6	1,652,611	4.42
4th qtr	19,593,840	99.4	1,395,570	82.4	1,074,456	100.9	22,063,866	98.2	1,679,137	13.14
2nd hlf	38,640,647	98.0	2,754,510	81.3	2,098,841	98.6	43,493,998	96.8	1,655,653	26.27
Total	76,501,957	97.9	5,553,424	82.6	3,974,540	99.8	86,029,921	96.8	1,649,979	52.14

The percentages of capacity operated in the first 6 months of 1942 are calculated on weekly capacities of 1,498,029 net tons open hearth, 128,911 net tons Bessemer and 71,682 net tons electric ingots and steel for castings, total 1,698,622 net tons; based on annual capacities as of Jan. 1, 1942, as follows: Open hearth 78,107,260 net tons, Bessemer 6,721,400 net tons, electric 3,737,510 net tons. Beginning July 1, 1942, the percentages of capacity operated are calculated on weekly capacities of 1,500,714 net tons open hearth, 128,911 net tons Bessemer and 81,049 net tons electric ingots and steel for castings, total 1,710,674 net tons; based on annual capacities as follows: Open hearth 78,247,230 net tons, Bessemer 6,721,400 net tons, Electric 4,225,890 net tons.

The percentages of capacity operated in 1943 are calculated on weekly capacities of 1,518,621 net tons open hearth, 125,681 net tons Bessemer and 87,360 net tons electric ingots and steel for castings, total 1,731,662 net tons; based on annual capacities as of January 1, 1943 as follows: Open hearth 79,180,880 net tons, Bessemer 6,553,000 net tons, electric 4,554,960 net tons.

242,929 tons of steel was produced, about 1,562,000 tons more than in the corresponding months of 1942.

During July the industry operated at an average of 96.4 per cent of capacity, rated as of the first of this year. By comparison, production in June represented 94.6 per cent of capacity, while in March operations reached full 100 per cent when production totaled 7,670,187 tons. In July, 1942, operations averaged 94.5 per cent.

Steel Corp. Shipments At Better Rate in July

Finished steel shipments in July by subsidiaries of the United States Steel Corp. totaled 1,660,762 net tons, an increase of 108,099 tons over June movement of 1,552,663 tons but were the lowest for that month since 1941. The decline from July, 1942, was 104,987 tons and from July, 1941, it was 5905 tons.

U. S. STEEL SHIPMENTS

(Inter-company shipments not included)
Net Tons

	1943	1942	1941	1940
Jan.	1,685,992	1,738,893	1,682,454	1,145,592
Feb.	1,691,592	1,616,587	1,548,451	1,009,256
Mar.	1,772,397	1,780,938	1,720,366	931,905
Apr.	1,630,828	1,758,894	1,687,674	907,904
May	1,706,543	1,834,127	1,745,295	1,084,057
June	1,552,663	1,774,068	1,668,637	1,209,684
July	1,660,762	1,765,749	1,666,667	1,296,887
7 mos	11,700,778	12,269,256	11,719,544	7,585,285
Aug.	.....	1,788,650	1,753,665	1,455,604
Sept.	.....	1,703,570	1,664,227	1,392,838
Oct.	.....	1,787,501	1,851,279	1,572,408
Nov.	.....	1,665,545	1,624,186	1,425,352
Dec.	.....	1,849,635	1,846,036	1,544,623
Total	.....	21,064,157	20,458,937	14,976,110
Adjustment	.....	*449,020	*42,333	†37,639
Total	.....	20,615,137	20,416,604	15,013,749

†Increase. *Decrease.

Ingot Rate Rises ½-Point to 98½%

Carnegie-Illinois Steel Corp. blows out Youngstown stack for relining. Rate above last year

PRODUCTION of open-hearth, bessemer and electric furnace ingots last week advanced ½-point to 98½ per cent of capacity. A year ago the rate was 97 per cent; two years ago it was 95½ per cent, both based on capacities as of those dates.

Carnegie-Illinois Steel Corp. blew out its Ohio No. 3 blast furnace Aug. 9 for relining. Pittsburgh Coke & Iron Co. stack at Sharpsville, Pa., is still down for repairs.

Mahoning river water temperature at Youngstown ranges much lower than last year because of supply from Berlin reservoir, holding flow more even. This aids steel processes by larger volume and more cooling effect.

Some labor trouble is hampering finished steel production at certain mills, principally at Buffalo currently.

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended Aug. 14	Change	Same Week 1942	Same Week 1941
Pittsburgh	100.5	+0.5	93	100
Chicago	99.5	+1.5	101	100
Eastern Pa.	95	+2	92	95.5
Youngstown	98	None	94	98
Wheeling	94	None	80.5	93
Cleveland	92.5	−1.5	97.8	89.5
Buffalo	90.5	None	90.5	90.5
Birmingham	95	None	95	90
New England	97	None	95	90
Cincinnati	87	−2	80	85.5
St. Louis	89	None	98	98
Detroit	90	+3	90	94
Average	98.5	+0.5	*97	*95.5

*Based on steelmaking capacities as of these dates.

Automotive War Production Continues To Score Gains

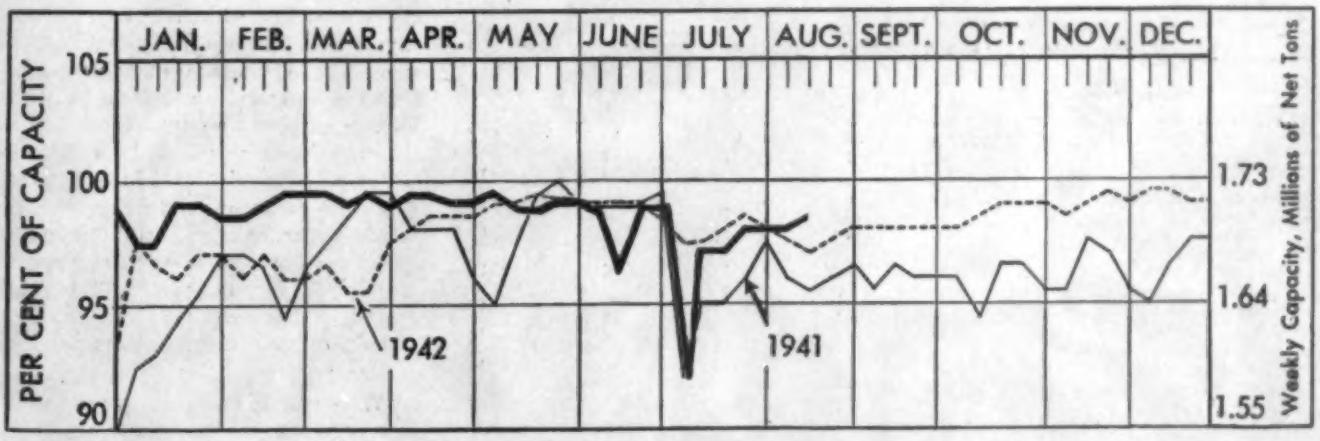
Automotive plants, steadily increasing their productive capacity, at present are delivering war goods totaling around $725,000,000 per month in value, or at an annual rate of well over $8,000,000,000. The figures are compiled by the Automotive Council for War Production.

Absorption in the problems of war production has not halted numerous analyses of the industry's postwar prospects. Executives believe postwar America will want from 20,000,000 to 25,000,000 new cars in five years.

New Electric Furnace Placed in Operation

Adding 65,000 tons annually to the nation's capacity for production of aircraft steels, a new electric furnace has been placed in operation at the South Chicago works, Carnegie-Illinois Steel Corp.

Comparative Steel Ingot Operations



STEEL INGOT PRODUCTION BY MONTHS

Net Tons, 000 omitted

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1943	7,424	6,826	7,670	7,374	7,545	7,027	7,376	....	....	....	....	....
1942	7,112	6,512	7,382	7,123	7,383	7,022	7,148	7,233	7,007	7,584	7,184	7,303
1941	6,922	6,230	7,124	6,754	7,044	6,792	6,812	6,907	6,811	7,236	6,960	7,150

PIG IRON PRODUCTION

1943	5,194	4,788	5,314	5,085	5,178	4,836	....	....	....	....	....	....
1942	4,983	4,560	5,055	4,896	5,073	4,955	5,051	5,009	4,937	5,236	5,083	5,201
1941	4,666	4,206	4,702	4,540	4,596	4,551	4,766	4,784	4,721	4,860	4,767	5,014

Fifth Regional War Labor Board Issues Foundry Wage Schedule

Going rates for key job classifications in approximately 45 labor market areas in Ohio, Kentucky and West Virginia set. . . Represent maximums which may be approved except in cases requiring special consideration

SOUND and tested going rates for key job classifications in the foundry industry in approximately 45 labor market areas in Ohio, Kentucky and West Virginia were announced last week by the Fifth Regional War Labor Board, Cleveland. They are, in effect, "ceiling" rates.

These rates represent the maximum which the regional board may approve, except in accordance with the Little Steel formula or in rare and unusual cases in which the critical needs of war production require that special consideration be given.

Specific rates were determined for Cincinnati, Columbus, Cleveland and Toledo, O., each of which maintained a 5-cent differential over the other in that order.

Employers do not have to meet the rates, Lewis M. Gill, regional WLB chairman, explained, and any adjustments proposed in accordance with these rates still require approval of the board before they can be put into effect.

Minimum sound and tested going rates for common labor have been established as follow:

60 cents in Bucyrus, Crestline, East Palestine, Findlay, Galion, Lancaster, Leetonia, Lisbon, Marion, Piqua, Portsmouth, Salem, Troy, and Zanesville, O., Covington and Newport, Ky., Parkersburg, W. Va.;

65 cents in Alliance, Ashland, Columbus, Elyria, Fostoria, Hamilton, Ironton, Mansfield, Middletown, Newark, Sandusky, and Sidney, O., Huntington, W. Va., and Ashland, Ky.; 67½ cents in Springfield, O.;

70 cents in Akron, Canton, Dayton, Kent, Lorain, Ravenna, Steubenville, Warren, and Youngstown, O.

In cities for which common labor rates have not been announced the regional board is using a tentative rate of 50 cents in Kentucky (except Louisville, 55 cents), 55 cents in West Virginia, and 60 cents in Ohio.

Try Four Plans for Ending Aircraft Production Slump

The manpower bottleneck now handicapping aircraft production is to be broken by concentration on certain aircraft types, blanket draft deferments, wage-incentive plans, and labor priorities.

Airplane construction will be concentrated on types that "hit the enemy hardest." In this group are the B-17 Flying Fortress, B-24 Liberator, P-38 Lockheed Lightning fighter, and P-51 Mustang fighter-bomber.

Sixty-day blanket draft deferments are being issued for all West Coast aircraft workers, and these may be extended indefinitely. One wage-incentive plan would involve wage increases throughout the plant on the basis of definite production increases. The labor-priorities system would give preference to the industry which carries the highest rating.

Railroad Wage Terms Are Reported Agreed Upon

An understanding for the settlement of the wage dispute between 1,250,000 non-operating railroad employes and the railroads was formulated last week. While terms of the agreement were not revealed, it was reported that the management group acceded to the demand that the railroads approve an award of 8 cents an hour, or $204,000,000 a year, originally recommended by a Presidential emergency board but disapproved subsequently by Director of Economic Stabilization Vinson.

Murray Can't See Eye-to-Eye with Biddle on Anti-Strike Law Ruling

INTERPRETATION of the strike provisions in the Smith-Connally act by Attorney General Biddle is protested by Philip Murray, president, Congress of Industrial Organizations, in a letter to President Roosevelt which was made public last week.

The interpretation by Biddle was made in connection with the case of two Springfield, Ill., plants of the Allis-Chalmers Mfg. Co. where on Aug. 4 a majority of employes voted for a strike. Notice of a labor dispute and call for a strike ballot was filed by district 50 of John L. Lewis' United Mine Workers. The CIO group was certified by the National Labor Relations Board in June of 1942 as the collective bargaining agency for employes of the plants. The Labor board had asked Biddle whether it should conduct a strike on notice from a "minority group."

"The opinion of the attorney general," wrote Murray to the President, "could not possibly reflect the intent of Congress, and its result is sheer chaos."

According to Murray, Biddle's ruling would permit any group of employes in a plant, however small, to furnish notice for a strike ballot and be entitled to the same even though in that plant a union

MINIMUM SOUND AND TESTED GOING FOUNDRY RATES*

Job Classification	Cincinnati	Columbus	Cleveland	Toledo
Molders (A & B)				
Floor	$1.10	$1.15	$1.20	$1.25
Bench	1.00	1.05	1.10	1.15
Machine	.90	.95	1.00	1.05
Coremakers (A & B)†				
Floor	1.10	1.15	1.20	1.25
Bench-Complex	1.00	1.05	1.10	1.15
Bench-Simplex	.80	.85	.90	.95
Cupola Tenders	.95	1.00	1.05	1.10
Furnace Operators	.95	1.00	1.05	1.10
Chippers	.90	.95	1.00	1.05
Grinders (Portable)	.90	.95	1.00	1.05
Grinders (Stationary)	.775	.825	.875	.925
Shakeout Men	.85	.90	.95	1.00
Helpers (charger, cupola tender, core-up man, bench molder)	.775	.825	.875	.925
Miscellaneous (packer, core sand mixer, shoveller, pour-off, equipment mover)	.725	.775	.825	.875
Foundry Labor (sweeper, clean-up, core sand mixer helper, core box painter)	.675	.725	.775	.825
Common Labor (janitors)	.60	.65	.70	.75

*Issued by the Fifth Regional War Labor Board, Cleveland, for ferrous and nonferrous foundries. Rates for special cases, such as may arise in connection with certain types of nonferrous foundries, will be determined in relation to special circumstances.

†Where separate rates are desired for grades A and B, the rate for grade A may be set at a point somewhat above the single rate specified in the table; the rate for grade B may be set at a point somewhat below.

may be the certified bargaining agency and have a collective bargaining agreement with the employer which by its terms forbids strikes.

The effect of this ruling, according to Murray, is to confront such unions, certified by the Labor board as collective bargaining representatives and having agreements with employers, with the threat that any small number of disgruntled employes in a plant may as a matter of right submit a notice calling for a strike ballot.

"Organized labor, determined to prevent for the duration of the war any stoppage of work, is faced with the ugly opinion of the attorney general which actually encourages stoppages of work," Murray asserted. "This is a very serious problem, created by the attorney general through his interpretation.

"I respectfully submit that the seriousness of the situation warrants the resubmission of the entire matter to the attorney general and that an opportunity be afforded to organized labor to present to him the problems in the situation in the hope that an interpretation may be obtained more consistent with both the intent and desire of Congress and the war needs of the country."

Steel Production Hampered By Strikes at Buffalo

BUFFALO

Seven unauthorized work stoppages by members of the United Steel Workers, CIO, were staged in less than a week in the local area.

All operations were suspended at the Wickwire Spencer Steel Co.'s River Road plant when approximately 1400 workers left their jobs in a dispute over the wages of 60 workers.

The steel conditioning department at the Republic Steel Corp. was virtually idle when about 300 men walked out, protesting the docking of two crane operators for one hour each.

A number of mechanics and repair men walked out in the blast furnace department of the Bethlehem Steel Co.'s Lackawanna plant because the company refused to discharge a worker who had declined to join the union.

Protesting the delay of the War Labor Board in handling an application for increase of wages, about 1800 workers walked out at the J. H. Williams & Co.

Walkout of approximately 360 at the Sloan plant of the Lake Erie Engineering Corp., was experienced and the discharge of an "incompetent" worker led to a walkout of about 150 workers at the Spring Perck Co. in Lackawanna. A walkout of about 425 Crosby Co. workers was attributed to WLB delay on a wage-increase petition.

STRIKE BALLOT: First strike vote under the Smith-Connally act was taken at the Allis-Chalmers plant, Springfield, Ill., to settle conflicting claims of the CIO Farm Equipment Workers and the United Mine Workers local. The ballot read, "Do you wish to permit an interruption of war production in wartime as a result of this dispute?" Acme photo

Buying Procedure on Warehouse Orders Revised

All orders for merchant trade products placed with a producer or another warehouse for delivery to warehouse stock on or after Oct. 1 must be accompanied by form WPB-2444 which replaces CMP-11. This change in procedure was announced by the War Production Board last week.

Orders for such products placed with producers or other warehouses prior to that date must be handled in accordance with order M-21-b-2, amended June 15.

Form WPB-2444 may be used in connection with merchant trade products through Sept. 30 but only to replace material sold from warehouse stock during the preceding 90 days on authorized controlled material orders. It may not be used prior to Oct. 1 to replace merchant trade products sold from stock on orders approved by CMP regulation No. 4.

Steel Construction Items Reclassified Under CMP

Steel shapes, plates, bars, concrete reinforcing bars, and wire products used for reinforcing concrete, in controlled material form, which have been formed, bent, punched, welded, riveted, bolted, or painted, by the fabricator, or which have been cut to specific size or length for a specific construction project by the fabricator, are to be treated as class A products instead of as controlled materials. This ruling was contained in direction No. 24 to CMP regulation No. 1, issued by the War Production Board.

Fabricators now are permitted to accept orders for all steel items going into construction as if they were class A products. All of the items covered by direction No. 24, however, must be treated as controlled materials by the customer of the fabricator in computing permitted inventories under CMP regulation No. 2.

The direction does not apply to that portion of the fabricator's operation which is subject to any order or regulation governing distribution of steel from, or the procurement of steel for, warehouse stocks.

Industry Urged To Provide More Training Facilities

Regional directors of the War Manpower Commission have been instructed to urge managers of war plants to provide more training facilities for persons already on their payrolls. This action was taken because reports received by the Commission's Bureau of Training show a steady decline of enrollments in pre-employment courses, particularly in communities where labor shortages have become acute.

"Share the Steel" Campaign Brings in 1,000,000 Tons

One phase of the Steel for Victory Drive—the "Share the Steel" campaign—has already resulted in a gain of more than 1,000,000 tons of steel for use during the last half of this year, it was announced last week by Donald M. Nelson, chairman of the War Production Board.

WINDOWS of WASHINGTON

Disappointing Chat

POSTWAR planning businessmen did not get much encouragement from President Roosevelt's most recent address to the nation. He did not say a thing on the subject of increasing job opportunities by enabling industry to thrive. The plan to take care of returning soldiers, sailors and other service men and women that the President roughly outlined contains six points. They would receive large mustering-out pay, unemployment insurance, educational training at government expense, government credit in various forms, government insurance in various forms, liberalized hospitalization, medical care and pensions. Businessmen who have read the address carefully view it as a new, big spending p'an for the peacetime era.

Copy Slants

Advertising managers and advertising salesmen will be interested in a new booklet which informs them how to aid the present campaign aimed at conserving the supply of high-speed cutting tools. It contains information on copy slants that are keyed directly to the war program. It is of value particularly in providing copy themes for many advertisers perplexed by the problem of preparing copy due to war conditions. Copies of the booklet may be obtained by writing the WPB Information Division, Conservation Section, 11th and H streets, Washington.

Political Dynamite

Several months ago Donald M. Nelson called Ernest Kanzler to Washington and asked him to make a digest of all government postwar planning proposals and submit it along with recommendations. Recently Mr. Kanzler completed this assignment. The digest, with recommendations, now is on Mr. Nelson's desk but due to his preoccupation, and that of other WPB top officials, over the urgencies of stepping up war production to maximum capacity, he does not expect to divert any time at the present to the matter. Later, when war production is a less urgent problem, he expects to give proper attention to the postwar outlook. In the meantime no publicity is being given to Mr. Kanzler's findings or recommendations.

While nobody has said so officially, Mr. Nelson's decision to devote no time at present to postwar planning also took into consideration the fact that the subject is complicated by the need for overhauling many laws now on the statute books and for overhauling administration policies. Hence, WPB recommendations might result in worsened relations with the government—a situation which might have a depressing effect on war production and on morale. There is much political dynamite in the postwar planning problem.

Uniform Policy—Maybe

One of the subjects long under debate in the Department of Commerce is the fact that whereas the department is supposed to be the friend of industry, other government agencies, such as Justice, Treasury, Federal Trade Commission, function as policeman, tax collector and monitor and that they regard business with a cold and fishy eye and are always on the alert for an opportunity to strike out at it. Nothing ever has been done about this lack of a uniform government viewpoint toward business; it just is not cricket for Mr. Jones, as head of Commerce, to tell Francis Biddle how to run Justice. Now that the Department of Commerce has decided to take business under its wing, there appears to be a chance of creating some sort of an interdepartmental committee to consider establishment of an all-over, uniform government attitude toward business.

LOOKING AHEAD

Several steel companies, in connection with their postwar planning, are taking into consideration the possibility the long-sustained government campaign for elimination of basing points may result in a universal system of f.o.b. mill prices on steel products. As a result, they are studying all possibilities for postwar expansion of steel consumption in and close to the communities in which their mills are located.

Relocation of consuming plants is likely to occur to some extent. Plans already have been made in a tentative way to shut down certain plants. Thought is being given to utilization of certain steelmaking facilities for other purposes.

Rooms at Last

For the first time in years Washington hotel managers report a surplus in rooms. Not only is Congress in recess but a lot of lobbyists and other people whose jobs depend on congressional activities are out of town. Renewed congestion can be expected when Congress reconvenes on Sept. 14.

Unpredictable John

Unpredictable John L. Lewis never was more surprising than when he recently appeared before the National War Labor Board to ask for approval of the portal-to-portal pay agreement with Illinois coal mine operators. He employed a complete change of tactics and he paid marked respect and courtesy to the board members whom he only a short time ago referred to as "puny little men inflated by a sense of their own importance." So effective was his conduct that after the hearing the board members surrounded him and there was considerable conversation featured by smiles and jovial remarks. Only exception was in the case of the board chairman, William H. Davis, who took part in the group but somewhat on the stiff side. Incidentally, Mr. Lewis did not allude to portal-to-portal pay as an increase in pay. Rather, he referred to it as something morally and rightfully due the coal miners.

Not Many To Go

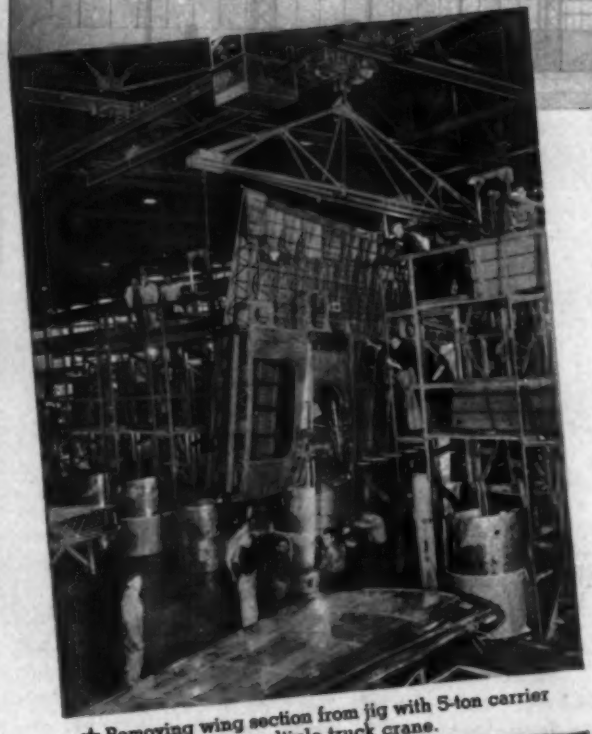
Close observers do not believe the congressional "anti-professor" mandate to the Office of Price Administration will be carried out to any notable degree. The ruling that this mandate need be applied only to section heads means that only about four more officials may go. The clique that stymied Administrator Prentiss Brown from getting better results continues almost intact.

Business Gets Break

Immediately after Henry Wallace launched his bitter attack on Jesse Jones for alleged slowing down of the Board of Economic Warfare's procurement program, Mr. Jones received many complimentary letters from business leaders all over the nation. All these letters set Mr. Jones' mind at work as to what could and can be done for the welfare of private enterprise. He decided the Department of Commerce, long supposed to be the fighting champion of business and industry, but actually not doing much that would come under this head, should function from here on as industry's friend and intercessor.

He has reorganized the Bureau of Foreign and Domestic Commerce, putting it in charge of three of the department's most competent and best-liked men, with instructions as to policy. Dr. Amos Taylor, formerly in charge of the Financial Division, is the new director of the Bureau of Foreign and Domestic Commerce. Assistants to the Director are Ray Miller, formerly assistant to Undersecretary Wayne Taylor, and O. P. Hopkins, up to now acting director of the bureau.

MASSIVE LOADS TRAVEL ON *Overhead Railways!*



★ Removing wing section from jig with 5-ton carrier on multiple truck crane.

★ Up and Over handling of massive hull with Overhead Railway System.

THE problem of "up and over" movement of massive loads in the mammoth bomber plants now turning out Flying Fortresses and Liberators was solved by American MonoRail engineers.

So efficient is the operation of these "Overhead Railways" that they have become standard equipment in the Boeing, Consolidated, Martin, Douglas and Ford bomber plants, in fact, wherever 4-motor bombers are built.

Nationally known architects who built these plants recognized early in their plans the advantage of calling upon American MonoRail engineers for highly specialized recommendations. This service is available in connection with war production now or for plant conversion in the future. Early consideration of handling problems often saves valuable time and needless building cost. Call your nearest American MonoRail representative or write us today.

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What Will Congress Do?

Legislators confronted by difficult task assembling all the facts in developing picture into coherent whole. . . Business, industry, labor and agriculture will be asked to assist in planning for the future

WASHINGTON

RECENTLY appointed Postwar Planning subcommittee of the House Ways and Means Committee is slated to hold a series of hearings soon after Congress reconvenes Sept. 14.

Members of the full committee long have been confused over the fact all major government departments and agencies have been doing postwar planning jobs of one type or another and the aim of the subcommittee is to call in the representatives of the different branches of the government, hear their stories and try to assemble them into some sort of a coherent picture out of which will ensue adequate legislation.

In addition, representatives of business, of industry, labor, agriculture will be asked to present their views and make recommendations as to what sort of legislative assistance they will need to contribute toward a healthy economy. They can get their names on the witness schedule by writing to the clerk of the Ways and Means Committee.

The subcommittee is keenly aware that it cannot reach intelligent conclusions by taking short-cuts. It proposes to make a thorough analysis of a highly complicated problem. For this reason it is expected the hearings will stretch out over a number of months and that the subcommittee will not be ready with its report until some time in 1944.

H. R. 2783 Due for Attention

Chairman of the subcommittee is Representative Walter A. Lynch (D. N. Y.). Other members are Representatives Jere Cooper (D. Tenn.), A. Sidney Camp (D. Ga.), Noble J. Gregory (D. Ky.), Daniel A. Reed (R. N. Y.), Donald H. McLean (R. N. J.), Richard M. Simpson (R. Pa.).

Chief concern at the start of the hearings will be over H. R. 2783, "a bill to provide for postwar planning, and for other purposes." Originally introduced by Mr. Lynch on Feb. 18, it was changed to incorporate certain suggestions made by President Roosevelt. It was reintroduced in its present form on May 24. The bill is cited as the "Federal-Aid Planning Act of 1943." This is the bill under which public works projects would be carried on by the individual states with funds donated or loaned by the Treasury.

It would provide for annual appropriations, beginning with the fiscal year June 30, 1944, of a sum "not less than $10,000,000, which shall be used for making payments to the states which have complied with the provisions of section 103 of this act." The purpose is that of "encouraging, co-operating with, and giving financial assistance to the states, and the political subdivisions thereof, in establishing and supporting agencies to prepare, revise, and maintain comprehensive plans and programs for their development."

Provides Funds for Surveys

Section 103 provides for the establishment of state planning agencies and defines procedure to the end that federal funds advanced to the states are used for the desired purposes.

The bill also provides for an appropriation of not more than $75,000,000 for advances by the President, through existing federal agencies, to the various states to be used in making "examinations, surveys, investigations, and architectural and engineering plans and specifications for specific public works and improvement projects as may be necessary to facilitate and expedite the selection and inauguration of such works in the postwar period."

In other words, the Lynch bill has only one factor in mind—that is, the use of public works projects in providing employment.

But that does not mean such factors as the effects of labor laws and the treatment of investors will be ignored.

As one spokesman puts it, "We will start out by considering H. R. 2783 and then will feel our way along. What we have in mind is to provide jobs for our boys when they come home from the war, and we are going to examine into all the ways in which that objective can be attained. We do not want our soldiers and sailors selling apples after this war."

If the hearings are carried out in this spirit, therefore, it seems assured that employers' recommendations will receive adequate consideration.

Three other bills that were referred to the Ways and Means Committee are worthy of comment because they reflect some of the present congressional thinking on the subject of postwar planning. They are H. R. 372, H. R. 1952 and H. R. 3058.

H. R. 372, introduced by Representative Jerry Voorhis (D. Calif.), would "provide financial credit for national defense in time of war without incurring public debt." It would "prevent postwar depression" and "provide for an orderly transition from a war economy to a peace economy."

Financial credit loaned by banks commonly fulfills all the functions of money, states the bill's preamble, and is therefore money in the sense of article 1, section 8, of the Constitution of the United States, which states that "The Congress shall have power to coin money, regulate the value thereof, and of foreign coin."

The custom of the government in borrowing financial credit from the banking system increases the public indebtedness, the preamble goes on. This is all wrong because "the financial credit thus lent to the government is in reality based upon the real credit of the people, which belongs to them and not to the private banking system."

H. R. 372 would authorize the Secretary of the Treasury to issue United States currency notes in the amount of congressional appropriations for military purposes, minus certain net increases in revenue that would result from levying "such wartime surtaxes as will cause an increase in gross revenue as nearly as possible equal to the rate of consumption of war supplies, so that replacements of war supplies consumed may be paid for by tax revenues, while any increase in the total of supplies involving a rising curve of physical production will be paid for by further issues of United States currency notes." Such surtaxes would be repealed after the war.

Refunds Are Termed "Bonus"

The currency notes would get legal tender in payment of all debts, public and private, but would not be eligible to be used as cash bank reserves, except as a 100 per cent reserve against an equivalent total amount of deposit liabilities. Upon the conclusion of the peace the Secretary of the Treasury would pay pro rata shares of the unexpended balance in the national defense credit accounts, in twelve monthly installments, to every American citizen aged 21 or older. These monthly payments would be known by the title "The Citizens' Victory Bonus."

Representative Voorhis introduced his bill on Jan. 6, 1943 and so far he has not got far with it. His plan to revolutionize the monetary system is one that not many congressmen can understand. The bill is a brain-tickler and anyone in search of diverting mental exercise will do well to write to the House Documents room for a copy.

H. R. 1952, introduced by Representa-

tive L. Mendel Rivers (D. S. C.) in February, is aimed at helping states and local subdivisions to begin accumulating financial reserves now to facilitate postwar expenditures for public works. It would authorize the issuance of special war savings bonds for purchase solely by the states and their political subdivisions, under attractive discount features. They would be redeemed on an annual interest basis of not less than 4 per cent, and would mature in not more than five years.

H. R. 3058, introduced June 25 by Representative Melvin J. Maas (R. Minn.) as "The Municipal Postwar Project Act of 1943," would encourage public works projects by means of federal loans. The projects visualized include construction or repair of municipally owned buildings, airports, water systems, sewage disposal plants and so on. This bill would appropriate $25,000,000 annually, beginning with the fiscal year ending June 30, 1944, so that municipalities would be encouraged to prepare construction programs and have them ready immediately after the emergency is over. The bill specifically reserves the right of Congress and the administration to authorize future distribution of government construction funds.

In the Senate, the Special Committee on Postwar Economic Policy and Planning (STEEL of July 26, p. 50) recently appointed two subcommittees which are getting ready to go into action soon after Congress reconvenes. One of these is the Subcommittee on Postwar Studies and is headed by Senator Joseph C. O'Mahoney (D. Wyo.), the other members being Charles L. McNary (R. Ore.) and Scott W. Lucas (D. Ill.). The other is a one man Subcommittee on Highways and Navigation; Senator Carl Hayden (D. Ariz.) heads this subcommittee which probably will be enlarged.

It will be the immediate concern of these subcommittees to study H. R. 2795, already passed by the House, and which was referred to the Senate Committee on Expenditures in the Executive Department. The other is H. R. 2959. These bills (STEEL of July 19, p. 84) are aimed at distribution of government-owned goods, including aircraft, in the postwar era in an orderly way and with least shock to the economy. These Senate Subcommittees, as is the case with the House Postwar Subcommittee, will feel their way along and they hope within a few months to have outlined a broad program as to legislation needed to guarantee jobs in the postwar period.

Full membership of the Senate Special Committee on Postwar Economic Policy and Planning includes Senator Walter F. George (D. Ga.), chairman, and Senators Alben W. Barkley (D. Ky.), Carl Hayden (D. Ariz.), Joseph C. O'Mahoney (D. Wyo.), Claude Pepper (D. Fla.), Scott W. Lucas (D. Ill.), Charles L. McNary (R. Ore.), Arthur H. Vandenberg (R. Mich.), Warren R. Austin (R. Vt.) and Robert A. Taft (R. O.).

It is quite likely that as soon as the Senate and House groups arrive at a better understanding of postwar legislative needs a joint Senate-House committee will be set up. With the war news more favorable, Congress as a whole is expected to recognize the urgency of setting up a postwar plan before war ends.

FOR OVERSEAS STEELMEN: A group of men from all parts of the world has been brought to this country by the United States Steel Export Co. to familiarize them with United States Steel Corp. plants, products, and export procedure. Here foremen at the Homestead Steel works, McKees Rocks, Pa., demonstrate the burnishing of axles. In the picture, left to right, are: P. M. Reis and W. S. Saenger, of Brazil; Frank Allison, lathe shop foreman; S. G. Tsamis, of Egypt; J. R. Bert, of New York; W. J. Aranda, of Chile, and Harry Klinger, general foreman of the plant's inspection and shipping department

Special Government Bureau To Work with Associations

Establishment of a special unit in the Bureau of Foreign and Domestic Commerce to work with the 2000 national trade associations has been completed. The unit will consolidate existing functions of the bureau in the trade association field, and will not include any expansion of personnel or expenditures.

In addition to national or regional trade associations, there are 7000 state and local associations, a large number of which are in regular contact with the Commerce Department. The ever increasing problems incident to the war, the bureau points out, have borne heavily on these organizations' executives, especially where they have been drawn into the war effort on behalf of their industries, and it is believed the co-operation offered by the bureau's new unit can be helpful in meeting them.

The unit will be headed by C. J. Judkins, who has been in immediate charge of trade association work for the Commerce Department for over ten years.

Group Appoints Committee To Study Renegotiation Act

Illinois Manufacturers' Association has appointed F. N. Bard, president, Barco Mfg. Co., Chicago, chairman of a special committee to make a thorough study of the renegotiation of government contracts. The association has expressed the conviction that excess profits should be recovered through the revenue laws and that war agencies should not be acting as tax collectors.

Among other members of the committee are: H. M. Dudley, Pullman-Standard Car Mfg. Co.; M. Keck and G. P. F. Smith, Borg-Warner Corp.; R. D. Wood, Mississippi Valley Structural Steel Co.; W. W. Miller and W. Reetz, Stewart-Warner Corp.; S. S. Sager, Chicago Hardware Foundry Co., and Fred H. Johnston, Goodman Mfg. Co.

PRIORITIES–ALLOCATIONS–PRICES

Weekly summaries of orders and regulations, together with official interpretations and directives, issued by War Production Board and Office of Price Administration

INSTRUCTIONS

CLASS B PRODUCTS: Official CMP Class B Product list of May 15, with nine changes in classifications, has been established for future operation under CMP. This represents final action with respect to any major class B product reclassification. Changes, effective beginning with first quarter, 1944, operations, are: Special military communications equipment becomes a class A product; air and hydraulic brakes, automobile wheel assemblies, tire chains, and carburetors (except aircraft carburetors) become class A products for Army programs only; metal cots, bunks and berths, gas cylinders, carbon dioxide portable fire extinguishers, and metal hospital beds become civilian class A products.

ALUMINUM PRODUCTS: Producers must refuse orders for delivery of aluminum products, including authorized controlled material orders and orders covered by aluminum-magnesium (AM) authorization numbers, unless he expects to be able to make delivery in the month specified in the order. They must refuse orders covered by their production directives when total orders scheduled for delivery in the month requested equal 110 per cent of the amount of such product authorized on their production directives. Orders not covered by a production directive must be refused when the producer's total orders for the product equal 105 per cent of his total expected production for the month in which delivery is requested. After accepting orders for delivery of aluminum products, if a producer finds he is unable to make delivery in the calendar month requested, he may fill the order at any time during the calendar quarter or during the first month following the calendar quarter without reporting the fact to WPB or receiving another allotment number.

If a producer is unable to make delivery during this period, he must notify the Aluminum and Magnesium Division of this fact by the last day of the quarter for which the order was accepted. The notification must include (1) allotment number, (2) name of the customer, (3) material covered by the order, (4) a statement as to when the producer can schedule the order for delivery. The producer then may fill the order for the products even after the end of the first month following the quarter in which delivery was requested without requiring a new allotment number.

When a producer finds that he is unable to make delivery in the month requested, he must give the order a place in his production schedule and must fill it ahead of all orders requesting delivery in any month after the requested delivery month shown on the order, unless otherwise directed by the War Production Board or the customer.

A customer still has the right to cancel his order for failure to deliver on time.

MRO SUPPLIES: Many purchasers of medical, surgical and dental goods are incorrectly applying ratings assigned under CMP regulations 5 and 5A to items covered by priorities regulation No. 3. MRO supply ratings cannot be applied to items appearing on lists A and B of priorities regulation No. 3. Items appearing on list A can be procured or sold regardless of any preference rating. Suppliers must not require a rating as a condition of sale for those items. List B covers a number of items which may be MRO supplies but which cannot be purchased with ratings authorized by CMP regulations 5 and 5A or any other blanket MRO rating. The only ratings which have validity are those authorized on WPB forms giving the specific item and quantity to be purchased. These are PD-1X, PD-1A, PD-200, PD-3A, and section A of PD-408.

CMP REGULATIONS

TESTING STEEL: Purchases now are permitted to receive for testing purposes sample orders of steel up to 1000 lb. of any one composition or a total of 3000 lb. of all compositions. This applies to all types of steel except stainless, tool steel and steel castings. Sample order delivery requirements for testing purposes on all other controlled materials, including stainless steel, tool steel and steel castings, continue to be limited to 1 per cent of minimum mill quantity which is prescribed with respect to the various types of controlled materials in schedule IV of CMP regulation No. 1 (CMP No. 1)

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L ORDERS

DISHWASHERS: Permission to produce commercial dishwashers does not include production of glass washers and other specialized washers. Maximum weights of iron and steel and copper-base alloy permitted under the simplified practices do not apply to motors, switches or wirings. (L-248)

GAGES: Schedule VI to order L-272 limits sizes of welding apparatus gages to 2-inch and 2½-inches diameter. Manufacturers now are prohibited from putting his customer's name or trademark on the dials, thus simplifying distribution. (L-272)

BROOMS: Use of metal in production of brooms is limited as follows: Amount of metal in case is limited to 2 ounces with 4¾ ounces permitted when 20 ounces or more of broom corn or other fiber is used; metal hangers or caps on all brooms and whisk brooms are banned; in case of so-called "metal cap brooms", no more than 5¼ ounces of metal may be used in the cap except that 6¾ ounces are permitted for brooms containing over 20 ounces of broom corn or fiber; number of turns of wire holding the fiber to the broom are limited. (L-283)

KETTLES: Kettles using steam at working pressures less than 90 lb., regardless of end use, are covered by order L-182 (Commercial Cooking and Food and Plate Warming Equipment) while those designed to operate with steam at working pressure of 90 lb. or over are controlled by order L-292 (Food Processing Machinery). (L-182)

M ORDERS

TOOL AND ALLOY STEELS: Limitation on use of vanadium by tool steel producers in the manufacture of hot-work steels and certain other alloy steels, except high speed steel, has been eased. Two classifications of high-speed steel have been redefined, setting formulas on each. Melting of high-speed steel, except within the specifications prescribed, is prohibited and quarterly melts are limited to 35 per cent of class B by weight to total high-speed steel melted during that quarter. A similar proportionate limit is placed on deliveries of class B steel but this limit on orders does not apply to placement of orders for high-speed steel with warehouses. (M-21-h)

METAL STRAPPING: Reinforcement metal edging on returnable cases, such as are used for delivering bottle beer, bread, etc., are not classified as metal strapping under the order covering strapping for shipping containers. (M-261)

P ORDERS

CIVILIAN AIRCRAFT: Assignment of preference ratings and the allotment of controlled materials necessary for the operation of commercial air liners, planes of the War Training Service, and Civil Air Patrol aircraft is now permitted. Means are also provided by which aircraft components, including controlled materials, may be directed to the operators properly entitled to receive equipment which has been set aside for them by the Aircraft Resources Control office and the Joint Aircraft committee. (P-47)

REAGENT CHEMICALS: A standard form of certification as to the uses of reagent chemicals ordered by research and other laboratories is provided by order P-135-a. The order also provides that each laboratory shall be entitled to the full small order exemption. Under the standard form, the purchaser certifies to the seller and to WPB "that the reagent chemicals called for by this order will be used, or resold for use, in a laboratory for one or more of the following purposes: analysis, testing control, educational or research." (P-135-a)

PRICE REGULATIONS

SCRAP SILVER: Ceiling price for scrap silver sold under the WPB order M-199 as Treasury or domestic silver casting metal is established as the seller's March, 1942, price plus 36.125 cents per fine troy ounce of contained silver. Previously the maximum price was the seller's highest price charged in March, 1942, plus 9.634 cents per fine troy ounce of contained silver. (GMPR)

SECONDARY ALUMINUM: Sellers of aluminum scrap under contracts entered into prior to June 23 of this year may make delivery until Aug. 23 at the old higher maximum prices in effect prior to June 23. Secondary aluminum ingot also may be delivered at the old higher prices until Aug. 23 under contracts entered into before Aug. 1. (No. 2)

MACHINES: Price control over replacement units and assemblies for mechanical refrigerators of domestic type has been transferred from the general maximum price regulation to the overall machinery price regulation. Only manufacturers' and wholesalers' sales are covered by the action. The items are placed in appendix B of regulation No. 136 which provides a formula method of computing prices reflecting prices in effect on March 31, 1942. (No. 136)

SAFETY EQUIPMENT: Services involving equipment used for the protection of property against the hazards of fire and theft are specifically subject to price ceilings as established by the services regulation. Included among this equipment are fire alarms, sprinkler systems, watchman boxes, burglar alarms, and other similar devices for detection of, or for protection against loss or damage by fire, theft, burglary or sabotage. (No. 165)

PLASTICS AND FLINT FIRE CLAY: OPA regional offices now are authorized to adjust ceiling prices for crude and processed plastic and flint fire clay in cases of local shortages. The provision covers only the fire

lay delivered within 100 miles of the point of production and was effective as of Aug. 12. (No. 188)

FURNACES: Manufacturers of cast iron coal-fired warm-air furnaces are permitted to increase their present ceilings and lowest current published list prices by 9 per cent, effective as of Aug. 4. A dollars-and-cents adjustment to the extent of increased cost also may be made at the jobber and retail levels. (No. 188)

Management Consultant Division Set Up in WPB

Management Consultant Division has been established within the War Production Board.

The new division was organized with John W. Nickerson of Manchester, Conn., as director to advise on broad management practices to promote effectiveness in war production. It will collaborate with the Labor Production office in finding ways to raise output through better industrial relations and improved management practices.

Appointments-Resignations

Roy W. Johnson has been appointed director of the Facilities Bureau, succeeding Charles E. Volkardt. Mr. Johnson had been deputy director of the bureau since the first of July. John B. McTigue has been appointed deputy director of the bureau.

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John F. Skillman has been appointed acting deputy chief, Materials Branch, War Production Board. He also will continue in his capacity as chief of the Ferrous Metals Section of the Materials Branch. He has been associated with WPB since June, 1942, and previously was the Detroit manager of the Berger Mfg. division, Republic Steel Corp.

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William S. Hammersley has been appointed director of the Consumers Durable Goods Division, WPB, succeeding Dudley P. Felt. Mr. Hammersley was formerly associated with New Jersey Zinc Co., and Reynolds Metals Co.

—o—

Dexter M. Keezer, has resigned his position as deputy administrator of the Office of Price Administration in charge of professional services. He has joined the Office of Lend-Lease and will work with the Harriman mission in London.

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Robert M. Hatfield has been appointed acting director of Production Scheduling Division, Production Controls Bureau, WPB. He was formerly chief of the Boiler Section, Power Division of the Office of War Utilities. Harry Zellman, former director of the division will continue with the Production Controls Bureau in a consulting capacity.

Fourth Quarter Allocations for New Construction Cover Requests Fully

Material for an additional 9500 freight cars provided. . . Industry also gets 400,000 tons of replacement rails, 240,000 tons of track accessories, and 300,000 tons of other maintenance materials. . . .

CONTROLLED materials which have just been allocated to the railroad industry for the fourth quarter indicate that supplies necessary to carry out the proposed locomotive and car building programs will be furnished as needed.

The railroad industry will take the largest share of the fourth quarter allocations to the transportation industry. It will get 400,000 tons of replacement rails, 240,000 tons of track accessories, and 300,000 tons of other maintenance materials.

A recapitulation of the railroad program shows that the industry will receive a total of 1,527,000 tons of new replacement rails during 1943 compared with 1,300,000 tons in 1942.

Western Area Projects

In the matter of materials for new construction and facilities, War Production Board granted the amount asked for by Office of Defense Transportation. ODT officials said that particular attention would be devoted to railroad construction projects in the western defense area.

The amount of material sought for the fourth quarter for the production of locomotives, freight cars, buses, street cars, trucks, and trailers was granted by the WPB Requirements committee.

Since the third quarter allocation by the Requirements committee included no steel for new freight cars, it was feared that with the completion of the 26,000 previously allocated, freight car production would come to a halt. Such will not be the case, ODT officials declared, as the steel for an additional 9500 cars has been allocated for the fourth quarter. However, most of these cars will not be completed until 1944.

As reported in the Aug. 9 issue of STEEL, schedules have been set up on a construction program that will result in the building of thousands of additional locomotives to be delivered by July, 1944. Steel requirements for the program are expected to exceed 1,000,000 tons.

An increase of nearly 6000 units in the third quarter car program also was announced recently. War Production Board has reversed an earlier position and is allocating plates through the Office of Defense Transportation for construction of these cars. Plates will be provided, however, with the restriction that the bulk of tonnage comes out of mill accumulations. There is a strong possibility that up to 10,000 additional cars may be placed in the fourth quarter.

In making the announcement of the new fourth quarter allocations, Office of Defense Transportation, which acts as the claimant agency for domestic transportation under CMP, disclosed that the transportation industry will receive 1,380,000 tons of carbon steel for "A" products for the fourth quarter compared with 1,200,000 tons for the third quarter, and a fourth quarter request to WPB of 1,590,000 tons. Requisite amounts of alloy steel, copper and aluminum were also allocated for use with the carbon steel.

ODT's claimant agency duties were enlarged this quarter when it was authorized to claim materials for automotive replacement parts. This function was previously exercised by the Automotive Division of the WPB. The WPB Requirements committee allocated 88,000 tons of carbon steel and related amounts of other materials to be used with it for automotive replacement parts.

Lend-Lease and Army To Get 2500 More Locomotives

Steam locomotive production schedules for 1944 have been revised upward again by WPB to 4000, an increase of 2500 over the total for 1943 and 20 times the number for 1941.

This latest increase, however, will mean no increase of railway engines on the home front. Officials explained that it is part of a schedule based on anticipated needs of the armed forces as they take over areas devastated by a retreating enemy. All the increased production will be assigned to Lend-Lease and to the Army.

Most of the new locomotives which will be sent to Africa, China, Italy, Russia, France, England and possibly other countries will be manufactured by the American and Baldwin Locomotive Works. These plants will be taken out of tank production and returned to their former programs.

Huge New Chicago Rolling Mill Typifies Industry's Expansion

Defense Plant Corp. units operated by Aluminum Co. of America will account for half of nation's annual 2,100,000,000-pound production, company's plants produce a third, and remaining 17 per cent is provided by other private interests

CHICAGO

PRODUCTION of sheet aluminum for aircraft was given a tremendous boost recently when the Aluminum Co. of America commenced operations in the new Chicago plant which it built for the Defense Plant Corp. Newsmen on Aug. 5 were given their first interior inspection of the works, one of the largest in the United States devoted to rolling aluminum sheet.

In addition, the plant produces aluminum alloys for forgings and extrusions.

The main plant, large enough to house 42 regulation football games played at the same time, is situated on approximately 280 acres in McCook, Ill.

Less than two years ago, one of the marvels of the aluminum world was a new rolling mill at a plant of the Aluminum Co. of America in Tennessee, which rolled aircraft sheet many times as fast as it had ever been rolled before. In the new Chicago Works are several such mills, as well as a large continuous mill which takes an aluminum ingot weighing thousands of pounds and flattens it out into a ribbon the length of a city block.

Production Rate Multiplied

Although wartime restrictions forbid release of information on production capacity of the Chicago Works, it can be said rolling mills of the modern type installed can turn out aluminum sheet at a rate over fifty times faster than was possible before the war.

Despite its huge size, the Chicago works was placed in partial operation within a remarkably short time after construction work started. Ground was broken April 20, 1942, and preliminary operations in the making of sheets began early in June of this year. Edward F. Maziarz, Aluminum Co. of America, was in charge of construction.

Management personnel at the works is: J. L. Patterson, works manager; T. I. Stephenson Jr., superintendent of equipment installation; Marvin Ramey Jr., industrial engineer; E. R. Christie, office manager; W. H. Derry, district purchasing agent; W. M. Wells, chief planner; H. H. Greer, manufacturing superintendent; J. H. Myers, chief inspector; M. H. Freeman, chief works engineer; C. M. Hastings, chief metallurgist; W. S. Trundle, superintendent of shipping; C. C. Cleborne, general foreman of service department; L. R. Mercer, personnel director; and B. R. Ohlausen, district traffic manager.

United States alone will be able to produce annually more than half again as much aluminum as the whole world ever produced in a single year before start of the year. Production currently is several times what it was in this country just preceding the war, as a result of tremendous expansion programs.

Aluminum Co. of America began improvements and additions to its own plants as early as 1937. These additions and improvements are practically completed, and represent an expenditure of $250,000,000 of the company's own money.

In addition to its own expansion program, the company has designed and built, or is building, for the Defense Plant Corp., more than $500,000,000 worth of facilities for production and fabrication of aluminum, all of which—there being 40 separate projects in this group—will be operated by Aluminum Co. personnel for DPC.

By end of 1943, United States will have a capacity for producing aluminum at an annual rate of more than 2,100,000,000 pounds—more than seven times production of 1937. Each of the several new plants will be able to make more aluminum than the entire nation produced at the World War I peak.

Four price reductions since the war started have brought the price of aluminum ingot down from 20 cents a pound to an all-time low of 15 cents.

American industry is, by itself, producing more aluminum today than it is believed the Axis powers will be able to produce in combination. And the aluminum production of our allies swings the balance overwhelmingly in the United Nations' favor.

Government Owns Many Plants

In connection with the overall situation, it is of interest to know how much of the capacity to produce aluminum in the war-winning effort is coming from government-financed projects. In a censor approved statement, C. C. Carr, in charge of public relations, Aluminum Co. of America, Pittsburgh, announced at the inspection of the new Chicago works that of the more than 2,100,000,000 pounds aluminum metal production capacity which will be available in the United States within a few months, the government-owned plants built and operated by the Aluminum Co. will account for more than half of this capacity, company-owned plants will provide for one-third of it and the balance will come from other private industrialists with their own or government financing. These figures are for aluminum metal alone and do not include efficient fabricating plants, such as the new Chicago works and others elsewhere.

Mr. Carr also announced for the first time that actual production shows the same relative picture as capacity. Commencing with the last week in July, he said, production of aluminum in government-owned, Aluminum company-operated plants exceeded the metal produced in the company's own plants.

Most recent estimates show 75 per cent of the average weight of a war plane is made up of various aluminum parts. Of this, approximately 48 per cent is aluminum sheet; 13 extruded shapes; 5 wire, rod or bar; 3 tubing; 11 forgings; 7 sand castings; and 13 per cent miscellaneous other aluminum parts.

More than 4000 pounds of aluminum go into the fabrication of the average pursuit plane; 11,000 pounds are required to make a medium bomber; and it takes 36,000 pounds on the average to manufacture a heavy bombing plane.

Aluminum also is vital to the war in countless other ways. Below the decks

LOT OF METAL

A few brief comparisons dramatize the scope of America's aluminum production program. For example, 2,100,000,000 pounds of aluminum—this nation's annual production capacity by the end of 1943—would place a 30-piece, high-quality cooking-utensil set in every one of America's 34,000,000 homes, with enough metal left over to manufacture 5,000,000 miles of the big aluminum transmission cable used extensively by power companies.

Application of aluminum in many war uses is expected to stimulate its consumption in numerous peacetime fields.

in a battleship it will be found in many applications. In the sleeping quarters on many new ships, berths and lockers are often built of aluminum. In the ship's galleys, aluminum equipment is used for food preparation. It is used for many structural purposes also on ships.

In addition, a battleship may well employ over a million pounds of aluminum and the metal also is widely used for ordnance, map making, military camera equipment, field kitchen equipment, pontoon bridges, ration packaging, and for scores of other purposes vital to the prosecution of the war.

Landing boats used by the Army and Marine Corps are powered by engines with aluminum pistons and cylinders, heads as well as other important parts. Tank treads frequently are made of aluminum. Machine guns often are mounted on aluminum tripods. Many of the mess kits, canteens and field kitchens provide wartime aluminum applications.

These are only a few of the applications in which aluminum travels to the battle fronts in global war.

Production of 2,100,000,000 pounds of aluminum will annually require more electric power than the total consumed in 1940 in 27 of the 48 states. In fact, the amount of current required to make one pound of aluminum would light the average American home for ten days. And for every pound of aluminum manufactured nine pounds of other materials —bauxite, cryolite, carbon, etc.—are required.

Above, run-out table for the huge "continuous mill" which rolls aluminum sheet for aircraft "skins" at the Aluminum Co. of America's new Chicago works. Aluminum sheet can be rolled over fifty times faster in this plant than with prewar equipment. The strip of aluminum sheet shown is more than a city block long

To the left is shown the large hot mill at the Aluminum Co. of America's new Chicago works. This mill rolls aluminum alloy ingots into slabs preparatory to manufacture into sheets for the "skins" of airplanes. The Chicago works was built and is being operated by the Aluminum company for the Defense Plant Corp.

MEN of INDUSTRY

Walter G. Hoffman, manager of the alloy department, Manganese Steel Division, American Brake Shoe Co., New York, has been named president of the company's recently acquired subsidiary, Electro Alloys Co., Elyria, O. **W. C. Whyte,** former president of Electro Alloys, continues in much the same executive capacity with the title of vice president.

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Adolfo Alvarez, vice president, Compania Westinghouse Electric Internacional, has been appointed general South American representative, Westinghouse Electric International Co., New York.

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Charles T. Ruhf, executive vice president, Mack Trucks Inc., Long Island City, N. Y., since the death of E. C. Fink last January, has been elected president of the company.

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John B. Lawson, former controller, Ferracute Machine Co., Bridgeton, N. J., has been elected vice president.

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H. E. Cable, welding engineer, Lincoln Electric Co., Cleveland, has been appointed Pittsburgh representative for the company, assisting **W. R. Persons,** Pittsburgh district manager.

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Millard H. Ronzone, former controller, steel division, Copperweld Steel Co., Glassport, Pa , has been elected treasurer of the company, succeeding **Thomas F. Troxell,** resigned. Mr. Troxell continues as a board member.

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Wilmer H. Cordes, advertising manager, American Steel & Wire Co., Cleveland, has been appointed head of the company's newly created sales research and development division.

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R. H. Hathaway, formerly assistant chief engineer, Hammond Machinery Builders, Inc., Kalamazoo, Mich., has joined Packer Machine Co., Meriden, Conn., as sales and service engineer.

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Ralph G. Rogers, on leave of absence from Servel Corp., Evansville, Ind., of which he was general superintendent, has been appointed factory manager, Evansville plant, Republic Aviation Corp., Farmingdale, N. Y.

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William D. Stansil has been appointed executive manager, Manufacturers' Association, Racine, Wis.

—o—

G. W. Thomson has been appointed abrasive engineer, Norton Co., Worcester, Mass., for the territory of Oklahoma, Arkansas, western Tennessee, and the northern sections of Louisiana, Texas and Mississippi. **Henry L. LeMay** has taken over Mr. Thomson's former territory in northern Illinois. **J. P. Landers** has been assigned to field engineering work in New York and New Jersey.

WALTER G. HOFFMAN

R. M. BURK

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Walter S. Jackson, former manager of the Sharon works, Sharon Steel Corp., Sharon, Pa., has been appointed general manager of the Lowellville, O., plant and the Sharon plant.

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Roger M. Bury has been named manager, Cleveland office, International Business Machines Corp.

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Walter J. Murphy, editor of *Industrial and Engineering Chemistry,* and *Chemical and Engineering News,* publications of the American Chemical Society, has been appointed a member of the National Research Council, Division of Chemistry and Chemical Technology, for a period of three years.

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Adolph G. Schroeder has been appointed manager, machinery department, Iron & Steel Products Inc., Chicago, succeeding **A. E. Waleski,** resigned.

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Oliver Fraser Jr., formerly associated with United States Steel Corp., Pittsburgh; Aluminum Co. of America, Pittsburgh; Bell Aircraft Corp., Buffalo; and North American Aviation Inc., Inglewood, Calif.; has been appointed industrial engineer, Ryan Aircraft Corp., San Diego, Calif.

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Capt. George R. Gottschalk has been appointed general manager, Hunter Arms Co., Fulton, N. Y.

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Page N. Hamilton, former New York area representative, Harshaw Chemical Co., has resigned to open an office at 205 East 42nd street, New York, to engage in a general chemical business, and will represent W. B. Lawson, Inc., Cleveland, in northern New Jersey, metropolitan New York and New England.

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R. M. Burk, former assistant to the vice president, National Supply Co., has been appointed sales manager, seamless products, Spang-Chalfant Inc., Pittsburgh, subsidiary of National Supply Co.

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John Easton, former chief of the technical development division, Civil Aeronautics Administration, has joined the Whiting Corp., Harvey, Ill., as director of development and standardization activities, succeeding **A. J. Brown,** who has been appointed manager of the company's Pacific Coast branch.

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E. H. Howell has been named manager, meter and instrument division, General Electric Co., Schenectady, N. Y., succeeding **W. F. Howe,** who has resigned but continues as consultant. Succeeding Mr. Howell as manager of General Electric's Toledo office is **S. J.**

MILLAR BRAINARD

Who has been appointed president, G & N Division, Cleveland Automatic Machine Co., Cleveland, noted in STEEL, Aug. 9, p. 66.

EARL L. RAMSEY

JAMES J. NELSON

Tombaugh, former sales engineer in Cleveland. **I. J. Kaar** and **G. W. Nevin** have been appointed managers of the receiver and tube divisions, respectively, of General Electric Co.'s electronics department.

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Earl L. Ramsey, manager of the Diesel Division, Ex-Cell-O Corp., Detroit, has joined the staff of the War Production Board, Washington. Mr. Ramsey, who had served with Ex-Cell-O Corp. for 17 years, is associated in his new position with **R. L. Vaniman,** director of WPB's Automotive Division.

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Ray F. Ellis has been appointed assistant general sales manager of the industrial, mill and export sales department, E. C. Atkins & Co., Indianapolis, Ind. Mr. Ellis will assist **K. W. Atkins,** vice president and general sales manager.

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Russell B. Barnett, former Philadelphia district manager, Peter A. Frasse & Co. Inc., New York, has been appointed vice president in charge of sales. **John D. Drummond** succeeds Mr. Barnett as Philadelphia sales manager.

Val Hansel has been appointed New York sales manager.

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William B. Griese has been named plant manager, Spencer Heater Division, Aviation Corp., Williamsport, Pa. Formerly, Mr. Griese had been plant manager of the Liquid Cooled Engine Division, Toledo, O.

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James J. Nelson, former sales manager, Cramp Brass & Iron Foundries division, Philadelphia, subsidiary of Baldwin Locomotive Works, has been named general manager of the division.

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Charles E. Stemmle, former assistant personnel manager, Ohio Crankshaft Co., Cleveland, has been appointed personnel director, succeeding **Robert R. Hamilton,** resigned.

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Gordon Cole has been appointed to the newly created position of director of advertising, Can Manufacturers Institute, Inc., Washington.

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E. R. Weitzel, former co-ordinating manufacturing manager, Murray Corp. of America, Detroit, has been appointed factory manager at Murray's new plant in Scranton, Pa., and **E. Kruger,** former superintendent of P-47 assembly at Detroit, has been made production superintendent at Scranton. **Frank McGary,** formerly engineering and mechanical division head in Detroit, is manager of the new plant.

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John P. Mullen has been appointed educational director, Gray Iron Founders' Society, Cleveland. Mr. Mullen will be located in the society's Washington offices.

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Joseph R. Krause has been elected advisory vice president, National Bronze & Aluminum Foundry Co., Cleveland. **Clarence Swallow** was appointed controller and assistant treasurer.

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Hudson W. Reed Jr., former safety director, American Welding & Mfg. Co., Warren, O., has been appointed director of personnel and safety.

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Howard Howie has been elected president and general manager, Knoxville Iron Co., Knoxville, Tenn., succeeding **H. W. VanBenschoten,** retired.

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Lester D. Chirgwin, general manager, Buffalo plant, Farrel-Birmingham Co. Inc., Ansonia, Conn., has been elected a director of the company.

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Alfred M. Wilson, assistant to the president, Minneapolis-Honeywell Regulator Co., Minneapolis, has been elected vice president.

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Homer S. Burns, assistant vice president and power superintendent, Freeport Sulphur Co., New York, will retire Sept. 1, after 31 years in the sulphur industry.

OBITUARIES . . .

William Greif, 87, founder, Greif Bros. Cooperage Corp., Cleveland, and at one time identified with 27 Cleveland corporations, including the Fanner Mfg. Co., died Aug. 8 in that city.

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John Spalding, head of the Spalding Foundry Co., Atlanta, Ga., died recently in that city.

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David W. Dunlevy, 76, retired president, Colonial Steel Co., Pittsburgh, died there Aug. 4.

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Samuel J. Eberwein, 47, for the past 20 years assistant superintendent, Electric Furnace Co., Salem, O., died recently in that city.

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O. J. Mulford, 74, president of the Gray Marine Motor Co., Detroit, and also president of the Michigan Street Car Advertising Co., Detroit, died there Aug. 3.

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Walter L. Rous, for 53 years cashier, Tonawanda Iron Corp., Tonawanda, N. Y., died Aug. 2 in Buffalo.

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Wilmer H. Reinecke, 55 for 20 years structural and sales engineer, Wisconsin Bridge & Iron Co., Milwaukee, and more recently a steel products sales representative, died in Milwaukee Aug. 7.

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Lucius Carroll, former treasurer, American Car & Foundry Co., New York, died recently in San Francisco while attending a war conference there.

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Allan Seymour, Philadelphia district manager for the abrasive division, Norton Co., Worcester, Mass., died recently.

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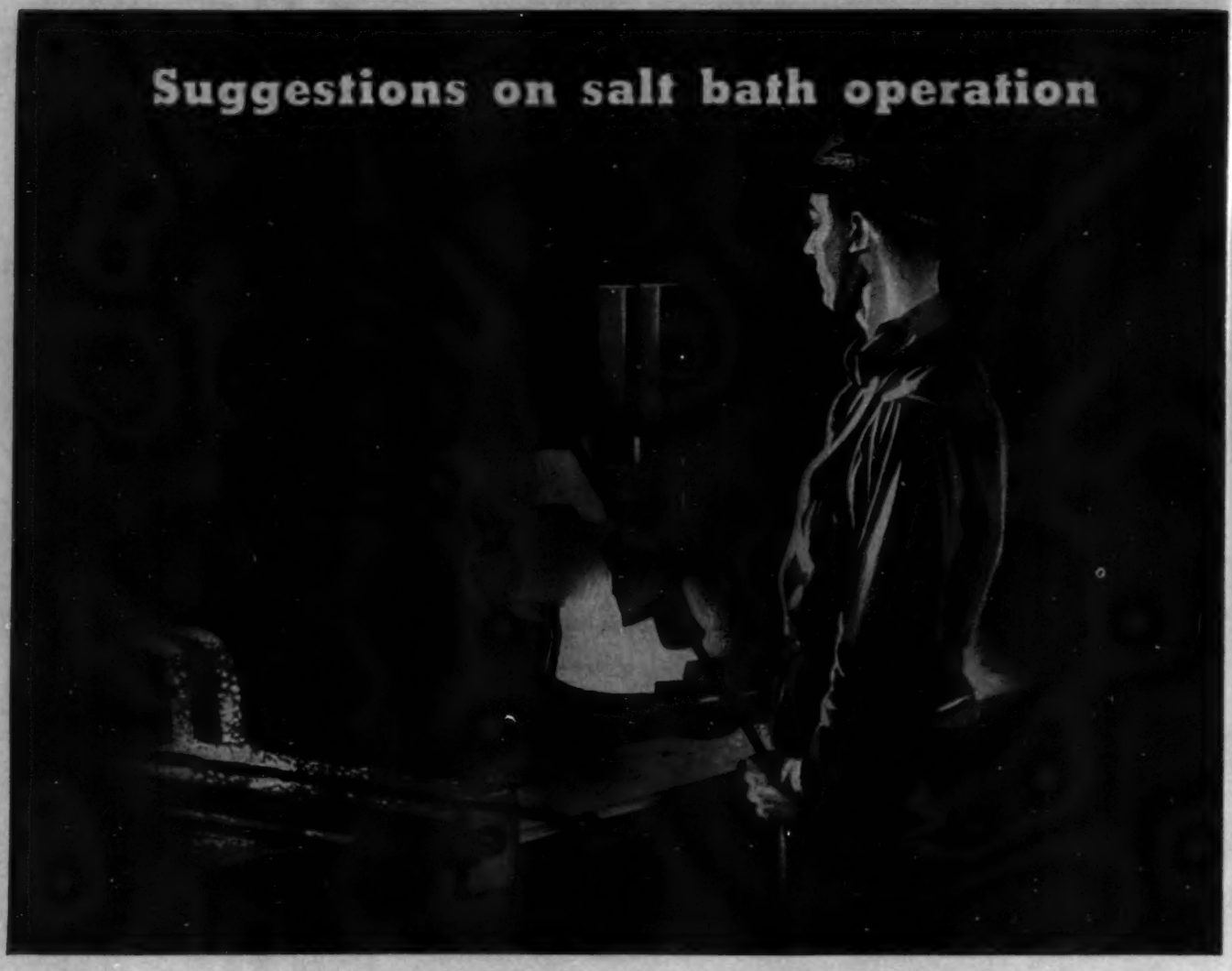
George A. Mohr, vice president, Boye & Emmes Machine Tool Co., Cincinnati, died there recently.

Suggestions on salt bath operation



Information supplied by an Industrial Publication

Properly used, the salt bath is a very effective means of preventing decarburization of high speed, carbon, and alloy steels during heat treatment. The following suggestions are offered as an aid to effective high speed tool steel heat treatment.

1. Clean work thoroughly. 2. Immerse in a preheat salt at 1500-1650° F. 3. Transfer to high heat bath at 2150-2250° F. 4. Immerse in quench bath at 1100-1200° F. After cooling to room temperature, wash in a hot alkaline cleaner, then reheat in salt to 1100° F.

To secure maximum pot life, (up to 3 years) use salts that are chemically neutral with refractory pots, and desludge bath periodically. Molten salt seals off all atmosphere, therefore decarburization, carburization, pitting, etching, or other surface defects can be avoided by using a suitable chloride salt and adding an acid rectifier. Several preparations are available containing rectifiers.

Adequate circulation in the bath is necessary to insure uniform temperature and prevent overshooting. Externally heated pots are not practical at high temperatures, so internally heated electrode baths, preferably with automatic, or electromotive, circulation are regarded as the most effective for mass production.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.

ARMY E NAVY

MOLYBDIC OXIDE, BRIQUETTED OR CANNED • FERROMOLYBDENUM • "CALCIUM MOLYBDATE"

Climax Mo-ly-b-den-um Company

500 Fifth Avenue • New York City

MOLY

By A. H. ALLEN Detroit Editor, STEEL

MIRRORS of MOTORDOM

Flying automobile, for years the subject of popular fancy and speculation, appears nearer actuality with William B. Stout actively working on several designs of small transport vehicles for Consolidated Vultee Aircraft

FOR MANY years the subject of popular fancy and speculation, the combination automobile-airplane now appears a little closer to actuality, with the news that the Stout Research Division, Consolidated Vultee Aircraft Corp. here, under direction of the visionary William B. Stout, is preparing several designs for an air-auto. Stout has enlarged his staff of designers and engineers and has as his principal assignment the planning and development of possible postwar vehicles for Convair.

The air-auto is not exactly new, for a number of them were built six years ago by Waldo E. Waterman, Santa Monica, Calif., aeronautical enthusiast, one of his designs being pictured herewith. This vehicle was called the Arrowbile and was flown and driven in various sections of the country in 1937 and 1938, making an appearance at the Cleveland National Air Races among other places. Waterman is now working with Stout at his Dearborn research headquarters and is redesigning the Arrowbile rather completely.

The original version was a steel tube framework covered with fabric. Wings were also fabric covered and were attached to the fuselage by means of tapered pins on the top and pins in struts at either side fitting into clevises on the fuselage. No tail assembly was involved, rudders being incorporated with the wing tips as shown. Power was supplied by a 6-cylinder Studebaker automotive engine mounted at the rear and driving a pusher propeller. A small plant was established by Waterman in Santa Monica and a number of Arrowbiles were built, but the whole project eventually was washed out by acute financial anemia.

Taking up where the Arrowbile left off, Stout Research now is projecting three types of small transport vehicles. The first is the Aerocar or flying automobile, weighing about 1500 pounds, with 60-inch wheel tread, three standard tires, 35-foot wingspread and capable of doing about 70 miles an hour on the road and 100 in the air. Designed primarily as an automobile, the Aerocar has a detachable wing and tail assembly which is left in the airport hangar while the vehicle is used on the road. Type of construction now being worked out is a steel tubular frame, covered with plastic panels.

The second vehicle which Stout's staff is dreaming up is a roadable airplane weighing about 800 pounds and with 30-foot wingspan. It will be designed for 400-mile range with speed around 120 miles per hour. Idea behind this creation is that in inclement weather the plane can be set down on landing strips alongside highways, the wings folded back and the journey continued on the road.

Experimenting With Helicopter

Third project is a new type of helicopter known as the Helicab, measuring about 25 feet in length, 6 feet in width and 8 feet in height. Rotor spread is around 33 feet. The cabin, seating up to five persons, will have a rounded plastic nose; fuselage will be of steel tube and duralumin construction, covered with plastic panels. Working with Stout on this development is E. Burke Wilford, authority on rotating wing aircraft. About three months of engineering work have been expended so far on the helicopter, but it will be another nine months before one will be ready to fly. Engine for the first model will be supplied by Air Cooled Devices, Syracuse, N. Y.

The first model of the Aerocar has been built, and a model of the roadable airplane will be ready in a couple of months. Both, of course, are far from being fully tested and approved, and it will likely be at least a year before they emerge from the chrysalis stage.

Stout is continuing research on his new engine design which originally was planned as a 100-horsepower unit weighing 100 pounds, but has now been revised to develop 150 horsepower and weigh 150 pounds. It is the plan to use this motor eventually in all three vehicles in process of development. It is not Stout's intention to undertake any manufacturing program on these units since his job is just to develop and engineer postwar ideas, after which they can be turned over to some of the Convair manufacturing facilities if it is determined that the market is waiting.

Army engineers have expressed interest in the plans and are said to have asked Stout to engineer a model using low-alloy steel for frame and fuselage skin. It remains to be seen whether this is practical. Stout at one time was planning to use a thin-gage stainless steel for the skin of his Skycar, small airplane which antedated the Aerocar and which was destroyed by fire last fall before it was delivered to the Army. Inability to develop sufficient strength because of the thin gage of the material led to its abandonment in favor of steel tubing and dural. Now Stout is talking about making a fuselage out of a new plastic, without any supporting framework. This will be a nice trick if he can do it.

One of the most amusing hoaxes ever engineered on Detroit newspapermen occurred about a week ago when one

The Arrowbile was built in 1938 by Waldo E. Waterman, aeronautical engineer (shown below in the road model), and was flown extensively at that time. Top air speed was 120 m.p.h., with road speed around 70 m.p.h. Though now obsolete, the Arrowbile was the predecessor of the road-air vehicles which the Stout Research division of Consolidated Vultee Aircraft Corp. is now developing at Dearborn, Mich. Mr. Waterman is now associated with that organization

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John Cunningham arrived in town and announced that he was vice president in charge of production for Henry J. Kaiser Co. and had just completed a deal for the purchase of a local stamping plant employing 400, in which parts were to be produced for the army vehicle which designers here have developed for Kaiser. All three papers carried front-page stories of the event which proved to be a total surprise for Mr. Kaiser when he learned of it, because he does not even have a John Cunningham on the payroll, much less a vice president by that name.

Later when confronted by outraged reporters at 4 a.m. Cunningham admitted the whole thing was just a brainstorm of his, that he had no connection with the Kaiser organization, that there was no stamping plant being purchased, that he was sorry about the whole thing. The curious part of the hoax is that the original news report was entirely plausible, because the Kaiser vehicle is about ready for manufacture if the Ordnance Department orders some, and manufacturing facilities are needed. The mystery is how Cunningham could have known all this inside information and why he should have gone to all the trouble to pull his hoax.

Kaiser Speculation Continues

There has been speculation locally over the possibility of Kaiser and his crowd of West Coast builders and contractors buying a controlling interest in Willys-Overland at Toledo. Present owners probably would stand to realize a nice profit by disposing of their holdings at current market levels, and by acquiring the plants at Toledo Kaiser would have a spacious though somewhat over-age automotive manufacturing setup in the Midwest.

Delegates to the UAW-CIO General Motors Council, representing union groups in 100 GM plants, voted recently to explore the possibilities of setting up a co-operative insurance plan to replace the Metropolitan Life Insurance Co. system now in effect in these plants. In a resolution supporting the move, the union delegates declared, "It is possible and probable that the corporation and Metropolitan both make large profits out of the premiums paid by the workers, and also control the investments of the money paid by the workers." This appears to be another sorry example of unions trying to smear benefits which employes are obtaining at almost insignificant cost, just for the sake of having something to discredit.

Ternstedt Division of Fisher Body has received contract for remote reading compass indicators and transmitters to be installed in aircraft. Designed and built by Bendix Aviation, the compass and indicator contains 206 parts, most of them small and made to close tolerances. Minuteness of some of the operations involved in producing the instrument can be gaged from the fact that one coil with diameter no greater than a thimble comprises 2050 windings over 20 laminations of metal. Before winding, these laminations are heat treated in sealed containers which are filled with hydrogen and welded airtight after inserting the part.

Several personnel changes have been announced in the local War Production Board office. A. C. Ryan, active with WPB since last November and recently executive assistant in Washington to E. C. Kanzler, Curtis Calder and Donald Davis, successively, has been named deputy director of the production service division. Since May he has been assistant to Hugo A. Weissbrodt, who recently returned to his post at International Harvester. In his new post Ryan will supervise the production, facilities and salvage departments, material redistribution and the power section; and also will direct activities in district offices in Grand Rapids and Toledo.

John D. McGillis has been appointed new WPB salvage manager for Michigan, succeeding P. H. Sheridan who is returning to his own business after 13 months with WPB.

Shipments of Rolls-Royce aircraft engines and marine engines for PT boats in the first six months of this year totaled $160,622,308, according to announcement from Packard, comparing with $86,435,663 in the same period a year ago. However, net earnings dropped from $8,966,151 to $1,974,489. The sharp drop is occasioned by the fact that the figure for the first half of 1942 did not reflect proportionate excess profits taxes or provision for contract renegotiations, adjustments made later in the year. These items for the first half of 1943 totaled $9,966,151, or over five times net earnings.

Industrial Expansion at Chicago Still Heavy

Plant expansion and other industrial activity in the Chicago area in July aggregated $26,440,000. According to the industrial department, Chicago Association of Commerce, these developments bring the total sum involved in expansion programs to a figure of $110,329,937 for the period of seven months of the year, and to a grand total for war and defense expansion in the area since July, 1940, to $928,984,937.

July Airplane Output Sets New Monthly Record

July airplane production set a new record, on the basis of WPB preliminary figures, with a gain of four per cent in number and a like percentage gain in weight over the June figures.

Total output last month amounted to 7373 military airplanes, Charles E. Wilson, executive vice chairman, War Production Board announced.

GOING "OVER": These Chevrolet military trucks, some four-wheel-drive and others two-wheel-drive units, are awaiting boxing for overseas transport at a seaboard export plant. To conserve shipping space the trucks will be torn down and boxed in compact weatherproof containers especially designed for the purpose

The BASIC Part of this Tool Shall Remain for Peace!

Fundamentally, this BAKER 26-HO hydraulic feed machine is just about the last word in clean-line, engineered design—fabricated symmetry in metal. The model shown is a *standard* unit equipped with a special heavy duty 2-spindle multiple head. It serves one of the country's largest radial-type aircraft engine builders in the drilling and core-drilling of wristpin hole in master rod; the left spindle used for drilling from solid in rod, the right spindle used for rough boring wristpin hole . . . . but one of the versatile set-ups permitted with this vertical drill.

Whether the owner of this machine tool continues to manufacture aircraft engines following the war—for commercial planes—or whether the plant will swing into production of a general commodity, this BAKER 26-HO Heavy Duty Drill, *as with all tools of* BAKER *design,* will lend itself for rapid conversion—because of its carefully executed *basic* design . . . . Bulletins, as modern as the tools themselves, will be mailed upon application!

Model 26-HO Vertical Cleanline Heavy Duty Single and Multiple Spindle Drill—Hydraulic Feed. Machine is equipped with a standard 3-station hand index table with special work holding fixtures; fixtures of simplified design, but built with accuracy for securing customer's required limits. Operation of all BAKER hydraulic feed machines is made easy from operator's standpoint—as machines are semi-automatic in cycle, with all electrical control push buttons mounted convenient to operator.

FOR EXCELLENCE

On March 20th the loyalty, skill and dilligence of the employes of Baker Brothers were recognized with an Army-Navy Award for excellence in production.

BAKER BROTHERS

TOLEDO, OHIO

WING TIPS

Boeing establishing branch subassembly plants in move designed to ease severe labor shortage. . . Republic Aircraft Products Detroit plants report 25 per cent output gain in first half of year. . . Douglas dedicates new plant

CONCERTED efforts, individual and civic, have somewhat relieved the manpower shortage at plants of the Boeing Aircraft Co., Seattle, and the threat to withhold additional contracts from other plants in the Pacific Northwest, including wood shipbuilding and small subcontract shops has not materialized.

At one time Boeing was said to be short 9000 workers. Boeing was up to schedule until June, according to P. G. Johnson, president, when the manpower shortage became acute.

Through branch plants for subassembly work, Boeing plans to ease the situation and already has established such branches at Grays Harbor, Chehalis, and Tacoma, with a third planned for Bellingham and still others proposed.

President Johnson advocates stabilization of wages on an area-wide basis, attributing some of the present difficulties to varying wage scales. He stated there is no reason why shipyard labor should be paid higher wages than aircraft labor, both being drawn from the same labor market. He added the average base wage at Boeing's is 99½ cents an hour with overtime at $1.13.

In remodeling branch plants, he stated, the company is prepared to spend $400,000 and expects to have 4000 workers in these outside factories. The proposed 10-hour daily shift has been rejected by the union but negotiations are still in progress along lines making for greater output. Mr. Johnson said the company is producing four times as many planes as the present plant was laid out to produce.

Boeing has placed an experimental plan into effect for granting time-off to employes having compelling personal reasons. Each employe's immediate foreman or supervisor is now authorized to excuse him for a few hours, a half or even a full day when the reason for the plant absence is imperative or unavoidable.

List Justifiable Absences

No time-off will be granted for errands which can be performed outside working hours. Justifiable absences will include these situations: Employe's inability to reach his ration board during its office hours; death or serious illness of an immediate member of the family. Application for excused absences must be received at least one day in advance. Authorized absences will not be held against the employe's record.

Production of aircraft propeller blades during the first six months of this year by American Propeller Corp., Toledo, O., subsidiary of the Aviation Corp., was nearly two and one-half times greater than in the last half of 1942, it was announced last week by William F. Wise, executive vice president.

The company's backlog of orders is now almost twice what it was a year ago.

Three models of the hollow steel type propeller blade manufactured exclusively by American Propeller at Toledo are now in production, Mr. Wise said, compared to the single model being made when the company opened its new plant in May, 1942. Other types are under development and the company's rate of production during the last half of 1943 is expected to be substantially increased.

Production for the first half of 1943 fiscal year by the two Detroit plants of Republic Aircraft Products Division of the Aviation Corp. showed an increase of more than 25 per cent over the production for the last half of 1942 and was almost double the output in the first half of last year.

At this rate of increase it is anticipated that by Oct. 1 Republic's monthly production of precision parts for aircraft propellers and engines will be equivalent to almost the total production for the first quarter of last year. Backlog of unfilled orders as of June 30 was three times the backlog a year ago.

Formal dedication of the new $33,000,000 plant of Douglas Aircraft Co. in Park Ridge, Ill., took place July 30 in ceremonies which included a test flight of the first C-54 Skymaster cargo plane assembled in the plant.

The plane is the army's largest transport plane, with four engines, a wing spread of 117 feet 6 inches, and a fuselage 93 feet 10 inches long. It weighs nearly 65,000 pounds fully loaded. Carrying capacity is 15 tons or 50 fully equipped men.

Saves Critical Steel

Completed in 10 months on what was formerly a cornfield, the plant was built by the Austin Co., Cleveland. A feature of the plant is its construction with laminated wood columns and trusses to save critical steel and other materials. It is said to be the largest wood industrial building in the world.

Several additional buildings, including a large final assembly structure and a new office and engineering building, are under construction at the Ryan Aeronautical Co. plant site on Lindbergh Field, San Diego, Calif., and will soon be ready for use in meeting increased production schedules.

The new final assembly building is adapted to the manufacture of much larger aircraft and assemblies than Ryan has built in the past. It will have 200-foot span trusses with clearance under them 35 feet, to permit cranes to lift completed assemblies vertically from one production fixture to another.

Adjoining the final assembly building will be additional first aid rooms with extensive medical facilities. Another feature of the new layout will be a

LARGER TALONS: The new external bomb racks give America's war eagles larger talons for heavier bomb loads. This recent photograph of a Boeing B-17-F Flying Fortress shows the forklike fingers of the two additional racks at the fuselage bottom near the wheels. The device permits much heavier bomb loads for limited-range operations

Exploding old assembly methods..

with the Speed Nut System

The spring tension principle of the SPEED NUT SYSTEM has revolutionized assembly methods everywhere. Now, in many cases, one SPEED NUT performs multiple functions, reduces number of parts, eliminates handling operations and drastically cuts weight and production costs.

For example: Our complete line of SPEED NUT angles combines the angle bracket and fastener into a single part. Self-retaining SPEED NUTS for all types of conduit clamps speed up assembly by eliminating unnecessary handling of parts. SPEED NUT retainer rings cut riveting operations to a minimum and save both in material and weight. SPEED NUT strips replace extruded gang channels. And our triangular nut plate for attachment of running lights, cuts riveting operations from 4 to 1. These are only 5 out of dozens of SPEED NUT designs that have virtually exploded conventional assembly methods. Write for our new summary catalog No. 185.

TINNERMAN PRODUCTS INC. • **2039 Fulton Rd., Cleveland, Ohio**

IN CANADA: Wallace Barnes Co., Ltd., Hamilton, Ontario. IN ENGLAND: Simmonds Aerocessories, Ltd., London

Speed Nuts **FASTEST THING IN FASTENINGS!**

TRAINING PROGRAM: Machine tool instructor shows this 16-year-old boy how to operate a turret lathe for a steel plate facing job at the Westinghouse transformer division, Sharon, Pa. The youngster is a member of the first group of 20 boys selected for training. By alternating two weeks in the shop and two weeks in school, they graduate from high school in the customary four years

service building for the company's automotive equipment.

When the present program is completed, the Ryan plant site, including factory and office buildings and paved areas, will cover 38 acres. Large parking lots and other surfaced areas are part of the new construction program, which also includes emergency water supply and fire protection facilities.

Many improvements to the present plant are also planned or under construction. Among these are the installation of overhead conveyors to facilitate the handling of dies and materials.

Engine design as related to airplane power, with particular reference to performance at varying altitudes, is the subject of a new 80-page non-technical booklet issued in preliminary form by the customer research staff of General Motors Corp., Detroit.

Liberally sprinkled with sketches and charts, the discussion is a creditable effort to couch in simple phrases, readily understandable by the layman, some of the intricacies behind the design and operation of aircraft engines and superchargers. Seven general types of superchargers are reviewed—single stage with only one speed; single stage, two speeds with mechanical clutch; single stage with variable speed hydraulic clutch; two stage with mechanical clutch; two stage with variable speed hydraulic clutch; two stage, variable speed with aftercooler, and turbo exhaust-driven with intercooler. Comparable characteristics of each are shown by chart and text.

An appendix presents a glossary of technical terms and definitions commonly used by engineers in connection with aircraft engines.

Copies of the booklet titled *Airplane Power* may be obtained by addressing General Motors, Room 11-230, Detroit 2.

United Aircraft Shipments Score 39 Per Cent Gain

A 39 per cent increase in dollar volume of shipments of aircraft engines, propellers and Navy fighter planes during the first half of 1943, represented almost entirely by production for the government was registered by the United Aircraft Corp., mid-year statement reveals.

Accelerated production, marked by the virtual disappearance of foreign sales, which accounted for 86 per cent of its production in 1942, was revealed in the company's report of shipments for the quarter ended June 30 of $174,628,901. Shipments for the six months period amounted to $333,798,454, as against $242,708,318 for the corresponding period of 1942.

During the last quarter, officials explained, the Navy Department elected to make lump-sum payments of approximately $35,000,000 due on plant facilities heretofore completed.

They Say:

"The burden of any tax or anti-inflation proposal should be as equitably distributed as possible, not only between upper and lower income groups but by recognizing that in any income group there may be people who need to be protected against the impact of tax increases."—Representative **Robert L. Doughton**, chairman, House Ways and Means Committee.

• • •

"In the first World War we provided one piece of artillery for every 1100 soldiers. Today there is one piece for every 46. Since the outbreak of the war America's armament industry has turned out nearly 160,000 large-caliber artillery, nearly 1,300,000 machine guns, and 5,000,000 rifles and submachine guns. We have made 165,000,000 rounds of artillery ammunition. Our ordnance plants have produced 22,000,000,000 rounds of small-arms ammunition.—Representative **Sam Rayburn**, speaker of the House.

"There is no more excuse for granting rate favoritism to one section than to another. Equalization of industrial opportunity for all sections of the country requires a reexamination and revision of the freight-rate structure."—Interior Secretary **Harold L. Ickes.**

• • •

"Only the people can hold down inflation, and they are smart enough to do it if the way is prepared and consistently sold them. The formula is simple: Don't Spend, Save."—**Henry Bruere**, president, Bowery Savings Bank.

• • •

"After the war let's get people to live so they can pass moderate physical examinations when they are over thirty, and let's not have a third of those rejections caused by their being crazy."—**Maj. Gen. Lewis B. Hershey**, National Director, Selective Service.

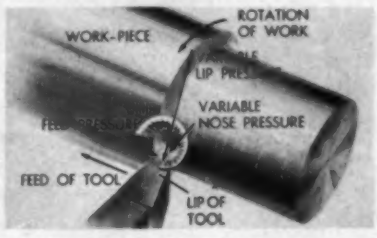
ONE OF A SERIES OF SUGGESTIONS TO AID PRODUCTION

HOW TO SOLVE OPERATING PROBLEMS WITH *Correct Lubrication*

How Cutting Oil Can Increase Your Production:

ONE OF A SERIES OF SUGGESTIONS TO AID PRODUCTION

1 FACTS ABOUT METAL CUTTING



The lip of a tool is an *extreme-pressure* area where the great pressures of the chip are exerted. At the tool nose and directly below the cutting edge is a *boundary area* which intermittently contacts the work-piece as the tool is deflected by the varying pressure of the chip. These microscopic vibrations create minute openings permitting a properly selected cutting oil to reach the pressure areas.

The *built-up edge* (see above) protects the cutting edge of the tool from frictional heat and excessive wear. An excessive build-up, however, results in its sloughing between tool and work-piece, thus marring the finish.

2 WHAT CUTTING OILS MUST HAVE (FOR GENERAL MACHINING)

PRESSURE RESISTANCE

Adequate pressure-resisting property in a cutting oil prevents excessive heating and wear of cutting tool and promotes smooth chip flow. RESULT: *Maximum feeds and cuts... minimum vibration... satisfactory finish.*

ANTI-WELD

Correct anti-welding property prevents excessive amount of built-up edge which can slough between tool and work, but fosters the necessary slight build-up which protects the cutting edge. RESULT: *Satisfactory finish* and *long tool life.*

LUBRICITY

Correct lubricity protects the boundary area of the tool from excessive wear. RESULT: *Long tool life... accurate size...smooth finish.*

COOLING ABILITY

Maximum cooling ability to remove frictional heat. RESULT: *Maximum speed...long tool life.*

3 PRODUCTION BENEFITS FROM USING S/V CUTTING OILS:

S/V Cutting Oils are the highest quality obtainable for the service for which they are recommended. They have a correct balance of essential cutting oil properties and their use results in...

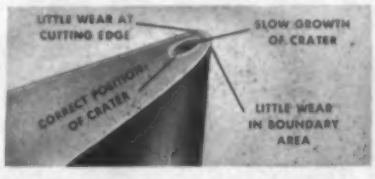
✓ **MAXIMUM CUTTING SPEEDS, FEEDS, CUTS—**
i.e., a maximum amount of metal removed per minute.

✓ **MAXIMUM PRODUCTIVE MACHINE TIME—**
i.e., minimum shut-downs for tool replacements.

✓ **MINIMUM REJECTS—**
due to poor finish or off-size.

Plus

✓ **TOOL CONSERVATION**



The picture above shows the best position of the crater on the lip of the tool. It results in the need for removing only a minimum of metal per grind. If finish and tool life are satisfactory, this is the ideal condition.

GARGOYLE Lubricants

SOCONY-VACUUM OIL COMPANY, INC.—Standard Oil of N. Y. Div. • White Star Div. • Lubrite Div. • Chicago Div. White Eagle Div. • Wadhams Div. • Magnolia Petroleum Company • General Petroleum Corporation of California

USE S/V CUTTING OILS

S/V VACSUL · S/V SULTRAN · S/V VACMUL

WEST'S INDUSTRY REMINISCENT OF

Area bristles with activity as expanded airplane plants, shipyards, steel and light metal manufacturing industries beckon thousands of workers from the East. . . San Francisco, long the hub of a vast territory, teems with war activity

Westward the course of Empire takes its way,
The first four acts already past;
A fifth shall close the drama with the day:
Time's noblest offspring is the last.
—George Berkeley, Bishop of Cloyne, in the early 1700's

TWO HUNDRED years have made little difference in the significance of the Bishop's quatrain. West of the Rocky Mountains "Time's noblest offspring" in the space of a short three years has become a lusty infant even now ringing out an industrial challenge to the rest of the country; in fact, to the world itself.

In attempting to make a general appraisal of industry on the western rim of the United States, it is well to keep two things in mind: First, as Milton Silverman in the *San Francisco Chronicle* puts it, "The second gold rush has hit the West Coast"; and second, the term "West Coast" covers one hell of a lot of territory.

War, of course, has brought the gold rush. Airplane plants, shipyards, the light metals industries—these are the three war babies which have beckoned literally hundreds of thousands of workers and their families. And the workers have been pouring into the West since 1940 at a rate of something like 1000 a day, an influx which is still under way but at a somewhat reduced rate.

As far as distance is concerned, it is not generally realized, at least by easterners, that from San Diego to Seattle is a trek of nearly 1500 miles, a lot of it over pretty rough country. That's farther than from New York to Kansas City. So when you begin to talk about the West Coast, you have to localize your thinking a little first, because while it is true that the whole strip of the coast has felt the "needle" of war production, the character of the change is different in one section than in another; the people themselves are different.

In Portland, they call Los Angeles the Southland, much as people in Buffalo refer to Birmingham, Ala., as Dixie. True, they call Los Angeles and its inhabitants a lot of other things besides, but the thing to keep in mind is the vast stretches of country involved—125 miles from San Diego to Los Angeles; 470 miles from Los Angeles to San Francisco; 718 miles from San Francisco to Portland; 183 miles from Portland to Seattle; and another 165 miles on up across the border to Vancouver, British Columbia.

Mileage is not the only measure of the distances involved, because in mountainous terrain your train or your automobile, for example, may move toward your destination only 10 miles while you actually travel 50, in process of winding up or down over a mountain range to get into the next valley. The contrast is remarkable to someone who may have spent most of his life traveling the "water level route" between Chicago and New York.

Particularly in southern California is the matter of distance am-

RY EXPANSION OF GOLD RUSH DAYS

By A. H. ALLEN
Associate Editor, STEEL

plified far beyond what your easterner or middle westerner is used to. Consider, for example, the city of Los Angeles, sprawling over a mere 451 square miles, while Los Angeles county stretches out over 4171 square miles. The market area represented here is calculated by the *Los Angeles Daily News* to cover territory equivalent to the state of Delaware, to embrace a population approximately that of Minnesota, Virginia or Kentucky; and to be pouring its retail sales dollars into cash registers to the tune of over a billion and a quarter dollars annually—a stupendous total when you realize it is exceeded by the totals for only nine entire states of the country.

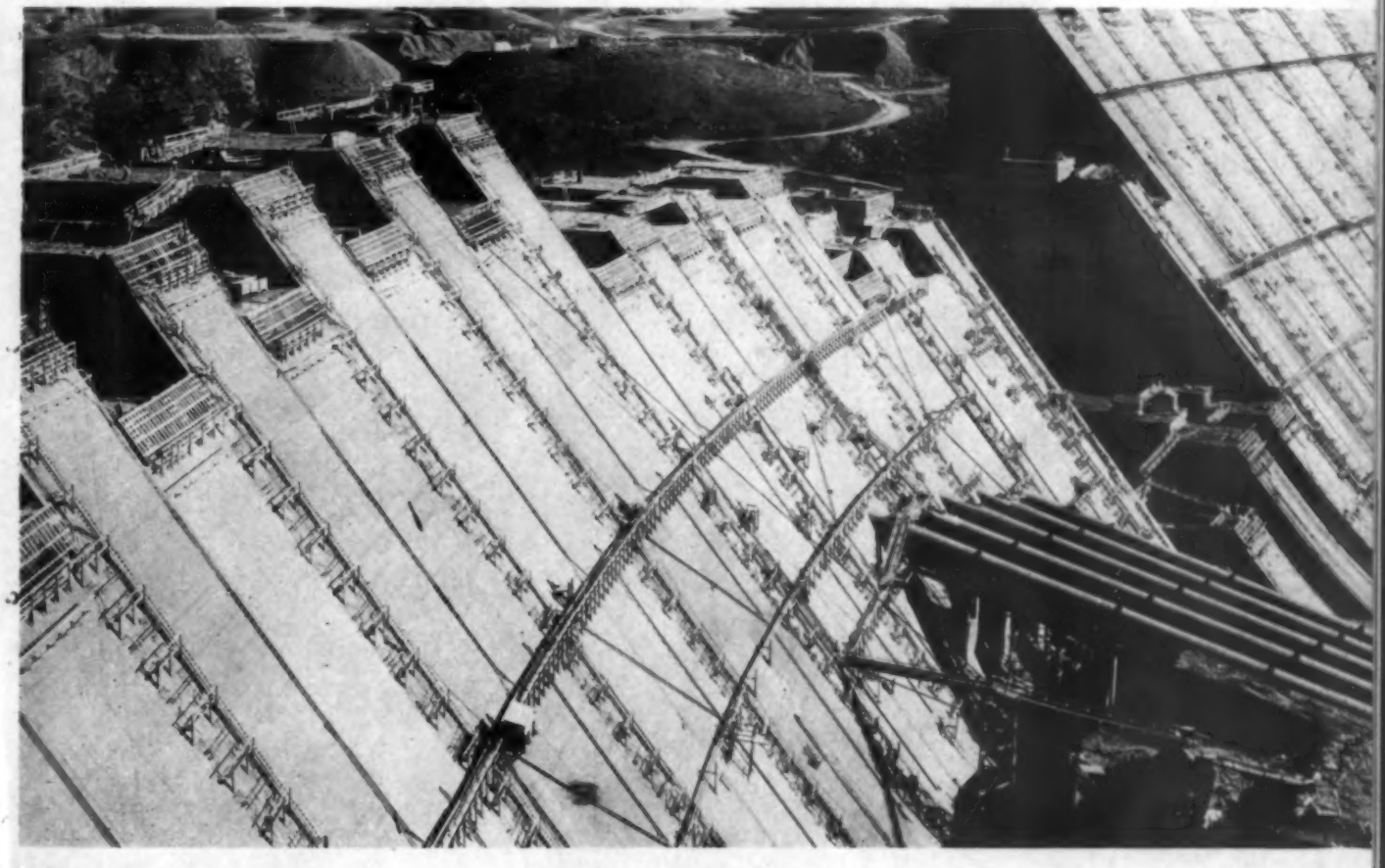
In its sprawling development, Los Angeles wrapped itself entirely around other incorporated cities as well as populous unincorporated areas of the county. So unwieldy did the district become from a statistical standpoint that back in 1940 a regional planning commission decided to break it down into 16 "census of business" areas. These are as follows, after each district being given an eastern or middle western city of comparable size:

Area	Comparable City
San Fernando Valley	Flint, Mich.
Glendale	Des Moines, Iowa
Pasadena	Erie, Pa.
Rural Foothill	Chattanooga, Tenn.
Alhambra-South Pasadena	Utica, N. Y.
Northeast	Springfield, Mass.
Eastside	Syracuse, N. Y.
Central (downtown)	Trenton, N. J.
Wilshire	Tulsa, Okla.
Hollywood	Grand Rapids, Mich.
Beverly Hills-Westwood	Jackson, Mich.
Santa Monica-West Coast	Salt Lake City, Utah
Southwest	Indianapolis, Ind.
Southeast	Columbus, O.
Whittier-Norwalk	Springfield, Ill.
South Coast-Harbor	Omaha, Nebr.

This compilation was made on the basis of 1940 figures which of course have changed appreciably. Population of the area jumped from 2,765,569 in 1940 to 3,112,171, an estimate for October, 1942, increase of 12.5 per cent. Population of the city of Los Angeles proper was 1,504,277 in 1940, and soared to an estimated 1,700,000 as of the first of this year.

Wage earners in manufacturing industries in Los Angeles county tell the real story of what has happened to West Coast industry in recent years—126,000

Typical of the power projects in the West which are providing industry with the necessary electricity for producing munitions is Shasta Dam pictured here. These power plants are playing a vital role in the war effort and are expected to be even more valuable in the postwar era when industry concentrates on peacetime production. NEA photo



in 1939 and 420,000 now. The same thing holds true on up the coast. Manufacturers in the San Francisco area employed 261,500 in March of this year, against 80,000 in 1939. The Portland area witnessed the almost unparalleled expansion of industrial employment from a mere 20,000 in 1940 to something like 160,000, not counting the 34,000 more who will be working in Kaiser's Vancouver, Wash., yards when it hits its peak. Seattle registered a 325 per cent gain in industrial employment from 1940 to the present figure of 121,000. Tacoma and Spokane were other Washington cities whose industrial employment has been inflated by the pressure of new war industry.

To get any kind of sensible appraisal of the entire West Coast it is necessary to break it up into the three sections—Los Angeles, San Francisco-Oakland, Portland-Seattle-Tacoma-Spokane—to see what makes each one tick and to examine how each has been affected by war and at the same time to suggest the contribution which each makes to overall West Coast industry at the present time.

First it may be apropos to make one point. It is this: Traditionally, San Francisco has considered itself the hub of the entire West Coast as far as management and finance were concerned—and rightly so. As recently as 1940, the balancing of six basic market factors of economic development—bank debits, manufacturing, agriculture, wholesale trade, commerce and livestock—showed the average for the Washington-Oregon area 27 per cent of the total for the Coast; the Southwest (Los Angeles) area 30 per cent, and the Central (San Francisco) area 43 per cent.

Mellowed By Tradition

The skyscrapers along Montgomery street in San Francisco have long been touted as the homes of the management brains of the West, the foci from which the directing strings to all manufacturing enterprise up and down the Coast were pulled taut or slacked. Down south in Los Angeles was just a bunch of playboys lolling in the sun, while up north it was just a bunch of rugged lumberjacks. Only San Francisco had come of age, had been sufficiently mellowed by tradition and experience to lead West Coast industry.

After all, San Francisco had been tested by earthquake and fire in 1906 and had come through. It could look back with amusement on the days when an anonymous poet wrote after looking at a building demolished in the carnage:

Put me somewhere west of East Street
Where there's nothin' left but dust;
Where the lads are all a-hustlin'
And where everything's gone bust.
Where the buildin's that are standin'
Sort of blink and blindly stare
At the damnedest finest ruins
Ever gazed on anywhere.
Bully ruins—brick and wall—
Through the night I've heard you call
Sort of sorry for each other
'Cause you had to break and fall.
From the Ferries to Van Ness
You're a God-forsaken mess
But the damnedest finest ruins—
Nothin' more, nothin' less!

The facts are that San Francisco's glory as the Paris of America and the New York of the West has dimmed considerably in the hectic years since war broke in Europe. The skyscrapers still cast their shadows in Montgomery street; the old electric cars still rumble up and down the four tracks on Market street to and from the piers and the Bridge Terminal; the Key System still shuttles its thousands daily across the magnificent Bay bridge to bustling Oakland. But to the outsider, San Francisco appears restless and troubled, even in the face of all-time highs in business indices. It may be resentful of surrendering a measure of its control over industry to vast new undertakings both in the south and in the northwest, or of being virtually shut out of the aircraft industry which swells payrolls in the Los Angeles and Seattle areas, or of the disruption to its normal way of life which 300,000 newcomers have brought, or of the enormous job involved in handling the embarkation of men and supplies to the Pacific military and naval fronts. At any rate, San Francisco is not happy, if indeed any city on the West Coast is happy these days.

Perhaps one potent reason for San Francisco's uneasiness is wrapped up with cost of living figures. February index for San Francisco was 124.6, compared

This is a general view of one of the main business arteries in busy wartime San Francisco, long considered the hub of the West Coast

with 124.5 in January and 114.2 a year ago. Average increase for all items in a year was 9.1 per cent, which gave the city the dubious distinction of leading all 21 of the cites of the country which were reported. Average for these cities was 7.1 per cent, with New York 8.2, Chicago 7, Cleveland 7.4, Philadelphia 7.4, Baltimore 6.4, Washington 6.3, Los Angeles 7.2 and Seattle 6.9. Principal impetus for the San Francisco increase was food which soared 18.1 per cent in the year. The city was also right up near the top in percentage increase in living costs with 24.6 per cent compared with the period 1935-39, against a 21-city average of 20.9 per cent.

Another possible explanation of San Francisco's troub'es lies in the fact that the city proper is compacted into an area of 42 square miles, which is not conducive to the ready absorption of hundreds of thousands of new workers and their families. Of course, many of these industrial workers work and live on the Oakland side of the bay, so they do not seriously complicate living conditions across the bay, but at any rate San Francisco cannot spread its newcomers out the way Los Angeles does it.

A goodly percentage of San Francisco business men take pride in the fact that the Bay Area is the "home grounds" of Henry J. Kaiser and his assorted enterprises. Kaiser operations head up on several floors of the 15-story Latham Square building in the heart of Oakland. In May, Kaiser was dickering to take over the entire building so that some of his departments scattered around Oakland at other locations could all move into one headquarters.

The West Coast cannot truthfully be said to be 100 per cent behind Kaiser. There are always dissenters; but one thing on which they all agree is that he and his boys "get things done." They may not operate within the economic limits of peacetime business, but that is figured to be beside the point in an all-out war. When the fighting is over it will be time to see if the Kaiser crowd can meet the tougher competition on a dollars and cents basis.

Kaiser's operations in the San Francisco area may be divided into four principal sections — the sand, gravel, crushed rock and concrete operations which were the forerunners for the other industries; the four separate shipyards at Richmond, north of Oakland; and the two Permanente operations in the Coast Range back of Sunnyvale, which take in cement manufacturing on one hand, and on the other, magnesium and ferroalloys production. The Kaiser iron and steel industry with its plant at Fontana also stems from the San Francisco area where administrative and engineering work is handled.

(This is the first article of a series, the second of which will appear next week.)

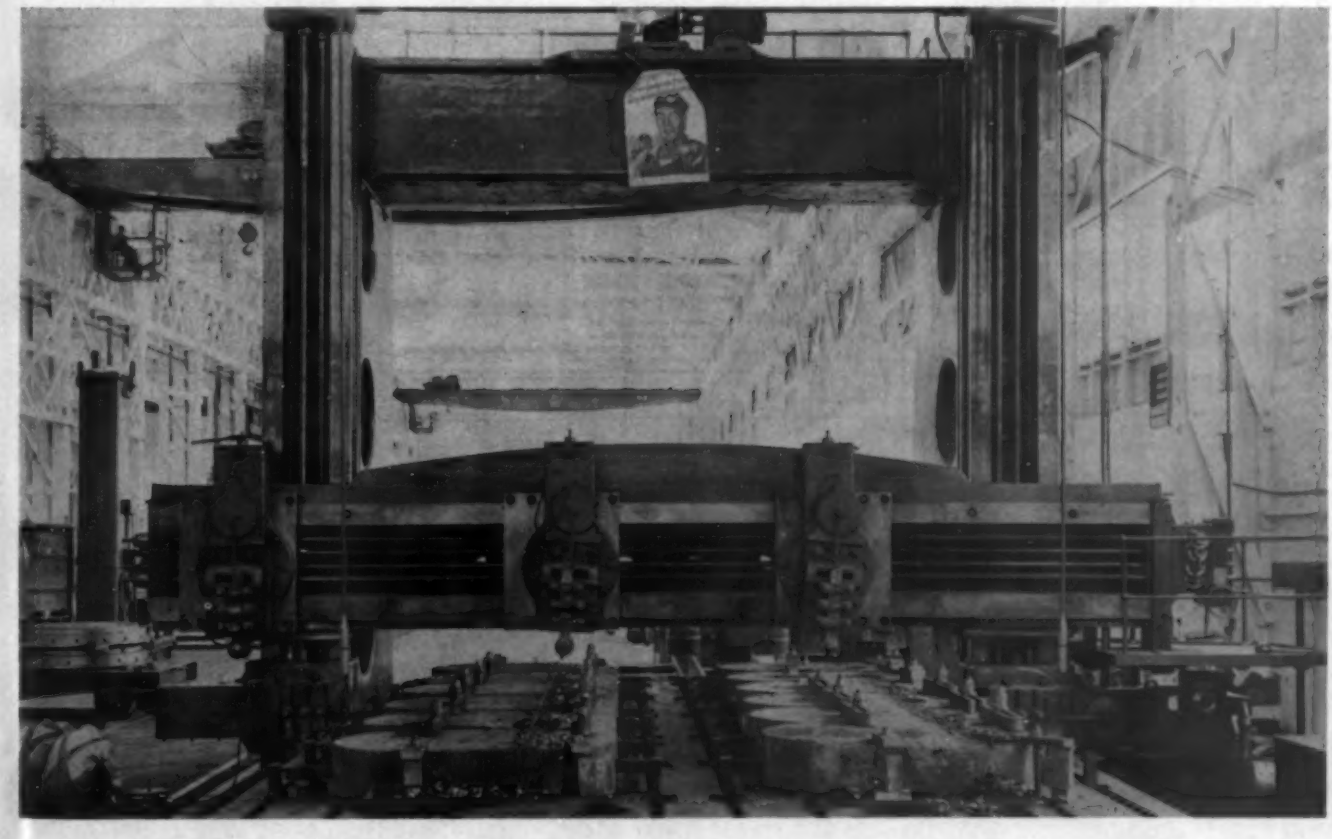
GROWING RAPIDLY

In the three Pacific Coast states of California, Oregon and Washington industrial employment gained from 200 to 300 per cent in the space of three years while the population overall is now close to 11,000,000 against 9,500,000 for 1940, an increase of around 15 per cent.

If the eight other western states are included, the overall population for the area is over 14,000,000, or well over 10 per cent of the nation's total.

At the same time it is interesting to note that 80 per cent of the people in this vast area comprising 39 per cent of the United States in territory are concentrated in the three Pacific Coast states, and this 80 per cent in turn is concentrated in three principal areas—Los Angeles, San Francisco-Oakland, and Portland-Seattle-Spokane.

This Craven planer, one of the largest in the world, was brought from England and is now installed in the turbine shop of the Joshua Hendy Iron Works, Sunnyvale, Calif. The planer works on twelve crankshaft webs simultaneously. Dimensions of the bed are 17 feet by 32 feet



THE BUSINESS TREND

Industry in High Gear Seeks To Meet Schedules

WITH few exceptions manufacturing activity, while influenced by shifting military needs and labor shortages, continues to edge upward. New production records have been established in some industries recently, notably aircraft and shipbuilding, but overall output is still behind projected War Production Board schedules. Incentive wage plans are being given more consideration as a means of stepping up lagging output schedules.

Without encroaching on the available supply of vital raw materials needed for the war program, an effort is being made by the Office of Civilian Requirements to preserve a sound and vigorous domestic economy. Arthur D. Whiteside, chief, OCR, states it is now the government's policy to meet all minimum essential civilian requirements. Repair parts will be provided, service trades will be maintained, small business fully utilized. From time to time bans on production of certain essential articles will be lifted and civilians will not be called upon to make unnecessary sacrifices.

FOREIGN TRADE—The monthly volume of imports fluctuated considerably during 1942, with no consistent trend developing. However, since January this year a distinct upward tendency has occurred.

Exports have with few exceptions moved steadily upward month by month since our entry into the war, and have been greatly accelerated since March of this year. May exports established a new peak of over one billion dollars, a gain of 11 per cent above the April total and 100 per cent over that reported in May, 1942.

In the first five months this year exports aggregated $4.5 billion, or an increase of 60.7 per cent over the $2.8 billion recorded in the like 1942 period. Imports during this same period were up 4 per cent to $1.2 billion.

COKE OUTPUT—Daily average rate of beehive and by-product coke production during June declined 32.8 and 3.2 per cent respectively from the May total, due to the stoppage of coal mining operations. June coke output of 5,490,536 net tons was 570,269 below May.

Stocks of by-product coke were reduced 11.2 per cent during June, totaling 842,531 tons or five days production at the June rate. Based on the June rate of consumption these stocks averaged 29.8 days' supply.

MACHINE TOOLS—New orders for machine tools throughout June declined to $38,322,000, the lowest level since the start of the war program. This compares with peak monthly bookings of $338,348,000 in March, 1942. A further recession in orders is believed to have occurred in July and to date this month. Machine tool shipments continued downward during June. Reflecting cancellations and the sharp decline in new orders during recent months, the industry's order backlog on June 30 had been reduced to average deliveries of only 4½ months, with a valuation of $511,478,000 in contrast with $1,389,363 on same date last year.

PIG IRON PRODUCTION—Shortage of coal due to the stoppage of mining operations, and necessity for relining stacks which had been pushed for many months resulted in the lowest monthly pig iron output during June since 1941. Production averaged 92.8 per cent of capacity in June, compared with 96.2 in the previous month, and an average of 96.5 for the year to July 1.

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)	98.0	98.0	97.0	97.5
Electric Power Distributed (million kilowatt hours)	4,241	4,227	3,919	3,637
Bituminous Coal Production (daily av.—1000 tons)	2,017	1,983	1,758	1,872
Petroleum Production (daily av.—1000 bbls.)	4,202	4,133	4,090	3,970
Construction Volume (ENR—unit $1,000,000)	$47.5	$41.2	$42.0	$164.0
Automobile and Truck Output (Ward's—number units)	19,100	19,900	19,435	19,240

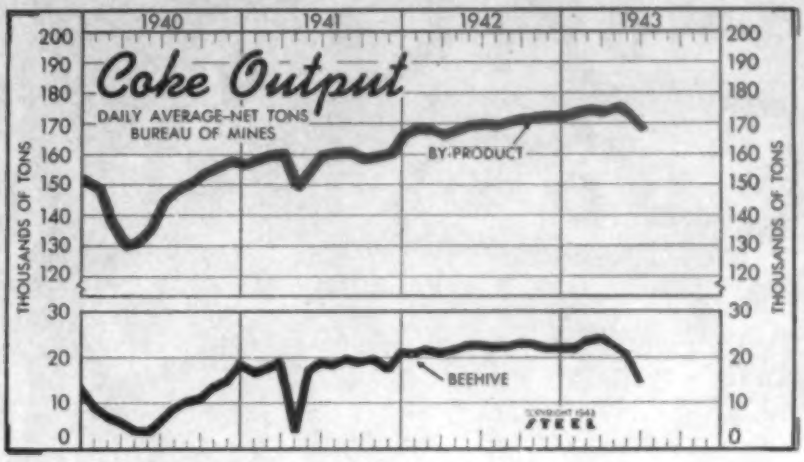
*Dates on request.

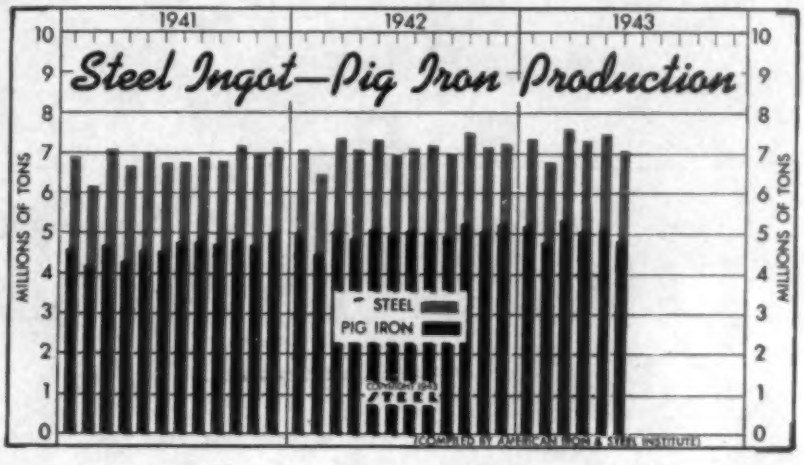
TRADE				
Freight Carloadings (unit—1000 cars)	884†	886	809	848
Business Failures (Dun & Bradstreet, number)	51	48	33	160
Money in Circulation (in millions of dollars)‡	$18,014	$17,799	$17,607	$12,794
Department Store Sales (change from like week a year ago)‡	+19%	+20%	+17%	+5%

†Preliminary. ‡Federal Reserve Board.

Coke Output
Bureau of Mines
(Daily average—Net tons)

	—By-Product—		—Beehive—	
	1943	1942	1943	1942
Jan.	174,044	168,508	21,440	20,874
Feb.	175,107	168,414	23,991	21,771
Mar.	175,051	167,733	24,369	21,032
Apr.	175,857	168,960	22,932	21,843
May	174,240	170,187	21,270	22,571
June	168,735	170,593	14,283	22,487
July		170,244		22,197
Aug.		171,443		22,333
Sept.		172,110		23,106
Oct.		172,211		23,148
Nov.		173,029		22,106
Dec.		173,163		22,000
Average		170,549		22,122





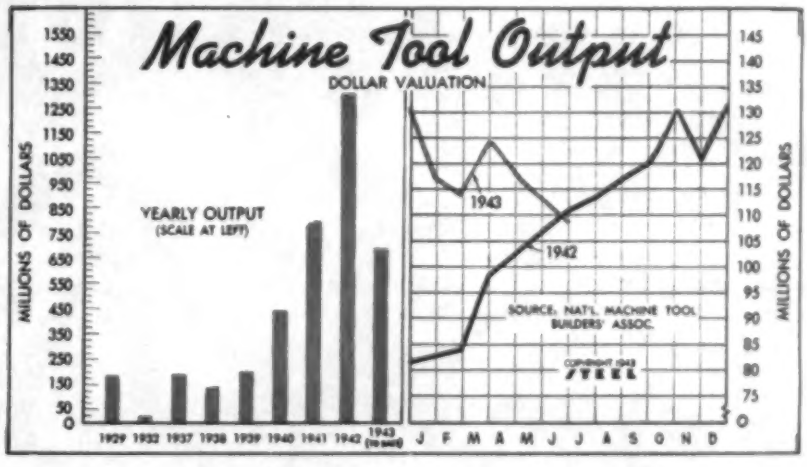
Iron, Steel Production
(Net tons—000 omitted)

	Steel Ingots		—Pig Iron—	
	1943	1942	1943	1942
Jan.	7,424	7,112	5,194	4,983
Feb.	6,826	6,512	4,766	4,500
Mar.	7,670	7,392	5,314	5,055
Apr.	7,374	7,122	5,035	4,896
May	7,545	7,382	5,178	5,073
June	7,027	7,015	4,836	4,935
July	7,376	7,148		5,051
Aug.		7,233		5,009
Sept.		7,067		4,937
Oct.		7,584		5,236
Nov.		7,184		5,083
Dec.		7,303		5,201
Total		86,061		59,959

Machine Tool Output
(000 omitted)

	1943	1942	1941
Jan.	$117,384	$83,547	$50,700
Feb.	114,593	84,432	54,000
Mar.	125,445	98,358	57,400
April	118,031	103,364	60,300
May	113,859	107,297	60,800
June	108,689	111,090	69,070
July		113,596	63,019
Aug.		117,342	74,069
Sept.		119,883	74,906
Oct.		130,008	84,178
Nov.		120,871	81,320
Dec.		131,960	81,485

Year	
1942	1,318,897
1941	775,300
1940	450,000
1939	210,000


Machine Tool Output
DOLLAR VALUATION
YEARLY OUTPUT
(SCALE AT LEFT)
1943
1942
SOURCE: NAT'L MACHINE TOOL BUILDERS' ASSOC.
MILLIONS OF DOLLARS
1929 1932 1937 1938 1939 1940 1941 1942 1943 (10 mos)
J F M A M J J A S O N D
STEEL

FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—billions)	$8,598	$7,936	$7,558	$6,875
Federal Gross Debt (billions)	$146.4	$144.8	$141.3	$82.1
Bond Volume, NYSE (millions)	$46.5	$70.1	$52.0	$29.3
Stocks Sales, NYSE (thousands)	4,730	8,162	4,163	1,450
Loans and Investment (millions)†	$46,482	$46,612	$45,843	$33,512
United States Government Obligations Held (millions)†	$32,347	$32,510	$31,414	$17,352

†Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$56.73	$56.73	$56.73	$56.73
Spot Commodity Index (Moody's, 15 items)†	245.2	243.8	243.1	203.6
Industrial Raw Materials (Bureau of Labor index)‡	113.0	113.3	114.0	100.5
Manufactured Products (Bureau of Labor index)‡	99.8	99.8	99.7	98.3

†1931 = 100; Friday series. ‡1926 = 100.

Republic Aviation Does Outstanding Job of Adapting Automotive Mass Production To Manufacture of . . . .

FIGHTING AIRCRAFT

By G. ELDRIDGE STEDMAN

NOW THAT Republic Aviation Corp.'s Indiana Division is reaching quantity production, part of the story of one of America's greatest war achievements can be told . . . for the first time anywhere, it is believed. On April 7, 1942, General Manager George A. Meyrer slithered into a cornfield north of Evansville and in the raw, rainy weather lifted an oozy spadeful of earth to break the ground for R. A. C.'s immense Indiana Division hangar and factory. Close behind him tumbled pile drivers, bulldozers and "cats".

On his first official visit from the corporation's Farmingdale, N. Y., headquarters on June 11, Ralph S. Damon, president of Republic Aviation, declared: "We'll turn out the first plane on schedule—one day sooner than possible". And they did, for on September 19, employes gathered to see the "Hoosier Spirit", first Thunderbolt P-47 built in Indiana, hurtle itself in trial flight. Now, a year from its beginning, this huge plant and its attendant modification center are nearing full production. What went on inside the plant rhythmically paralleling the advancement of plant construction, is the subject of this article.

Alexander Kartveli, R. A. C. vice president and chief engineer . . . P-47 designer . . . came from Tiflis in the Caucasus; a wizard mathematician, trapeze artist, test pilot. Kartveli literally broke his neck working for the Bleriot Co. in France. Associated with Levine, Fokker and Seversky (which became Republic Aviation Corp.) his first pursuit design became the P-35 and then a series of others, ending with the famed Thunderbolt. Of it, Lieut. Leroy Ista, Army Air Corps, completing his final training at Langley Field, Va., stated in a War Department release: "That 2000 horsepower Pratt & Whitney engine is a terrific power plant. That, together with its turbo-supercharger and Curtiss propeller, hurl the Thunderbolt at speeds and ceilings which no other fighter, Allied or enemy, can attain." Weighing 13,000 pounds and capable of efficient maneuver at 35,000 feet altitude, the Thunderbolt is accredited as being the finest interceptor-fighter in the world.

War is the great magnifier . . . of problems, of quantities, of design and processing requirements. War won't wait. Neither did Republic. It has done one of the most outstanding jobs of adapting progressive assembly methods used by the automotive industries

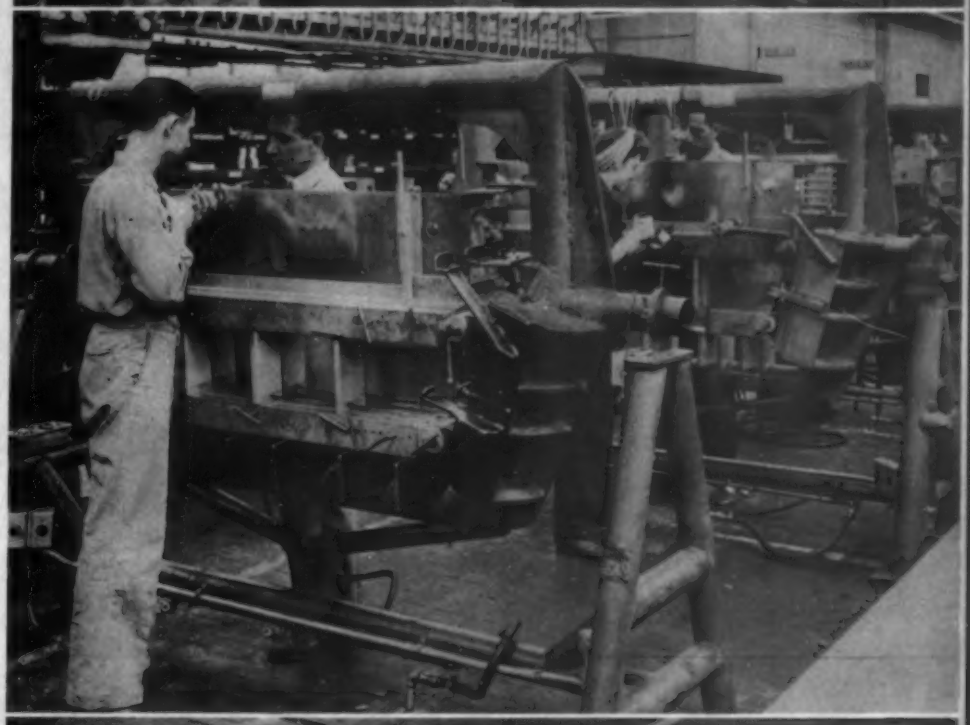
Fig. 2—Upper firewall drill jig being checked by Chief Tool Engineer H. W. Norton, Factory Manager William Dubusker and Assistant Tool Engineer Sam Hyatt

Fig. 1. (Left, opposite page)—View of final assembly showing planes on conveyor moving to detail stations

Fig. 3. (Top, right)—Deep drawing section of wing fairing is completed in one operation here

Fig. 4. (Center, right)—Subassembly of lower firewall progresses in these three fixtures. Note simple yet extremely substantial jigs

Fig. 5. (Bottom, right)—Upper section of fuselage is made as a complete subassembly here from prefabricated parts. All items in this assembly have full size holes, need no fitting, go together fast



so they can be employed in aircraft construction. Republic Aviation's Indiana Division plant represents a uniquely successful accomplishment in this field. Because of this, its production ability in relation to man-hours has enlarged in a manner that is destined to make history in war and in the peace thereafter.

Until the advent of war, from 100 to 200 units of a model represented a whale of an order. Now, 1000 units are regarded as a small contract. In the old days, 60 to 70 per cent of fabrication was accomplished by experienced mechanics, largely by hand.

William Dubusker, factory manager, at the Indiana Division, knew that he faced all these problems when management assigned him the responsibility of tooling up for midwest production. He determined to whip them by converting the tooling technique to make fullest use of automotive methods. Eight years now with RAC, Dubusker has ably served Keystone, Curtiss, Great Lakes. In his experience he has been foreman, inspector, purchaser of equipment, machinery superintendent, and general superintendent in these various aircraft plants. Much of RAC Indiana Division's record rush into mass production is credited to him . . . and to H. Norton, chief tool engineer, and his assistant, Sam Hyatt, who was in charge of the Detroit office.

"When management told me I was elected to tool this Midwest plant, the question was: 'How am I going to put experience into the heads and hands of the thousands of green workers we must recruit?' ", Mr. Dubusker told me. "I knew we would have to employ workers who had never even seen a plane close-up, and with 99 per cent of them inexperienced in aircraft construction, and the majority of these having never previously worked in any plant. I decided to follow automotive methods completely. The policy decided upon was to

tool up 100 per cent to remove the human factor entirely—to take all guesswork away.

"We surveyed the labor situation and found that we would have to rely upon female labor. Our plant here will soon be operating with 70 per cent of the employes women. Recognizing that women workers require maximum tooling, we decided to tool up so completely that fool-proof fabrication could be accomplished by the greenest workers with but little training. This we have now accomplished."

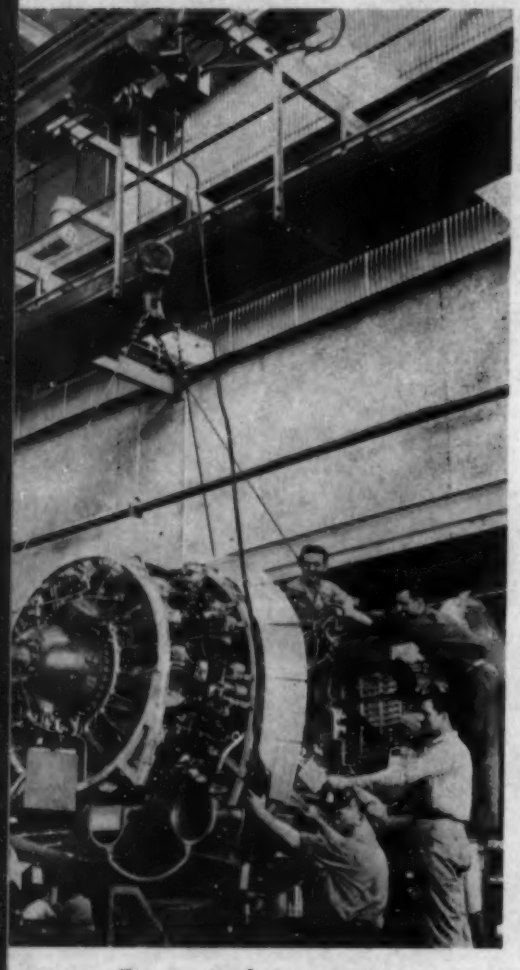


Fig. 6—A job for experts . . . assembling the power plant into the fuselage in final assembly section. Notice crane is operated by man on floor through pendent push-button station

The requirement was to tool the complete plant both properly and swiftly. It had virtually to keep pace with the speed of plant construction. To accomplish this, Dubusker arranged to move the basic functions of tool design and expediting to Detroit. He placed responsibility for tool design and processing in charge of Allen Engineering Co. there. H. Norton, Indiana Division, chief tool engineer, lived on the job in Detroit, 24 hours a day. Tools were built completely in Detroit.

Under Allen Engineering Co., tool and die work was parcelled out to: Arrowsmith Tool & Die Co., Cadillac Tool & Die Co., Congress Tool & Die Co., Dettary Engineering Co., Donnelly-Powers Engineering Co., Dynamic Tool & Die Co., Douglas Tool & Die Co., Federal Engineering Co., Great Lakes Tool & Die Co., Godin Tool & Die Co., Heidrich Tool & Die Co., Heidrich Engineering Co., McReynolds Die & Tool Co., Northfield Engineering Co., Mid City Tool & Die Co., Oregon Tool & Die Co., Pedersen Tool & Die Co., Pryde Tool & Die Co., Ramco Products, Ridge Tool & Die Co., Teppert Tool & Die Co., and Wayne Tool & Die Co.

Initial procedure was to divide the fuselage into 25 items such as front section (upper deck), crash protector, bulkhead, side panels, fire wall, etc. Two full-scale model fuselages were built at Farmingdale for tooling design purposes. These were designed and built to this sectional plan. Their parts were bolted together rather than riveted to permit each section to be disassembled and explored. These 25 design units for fuselage tooling were then assigned among the companies named.

Four Elements To Speed Work

The Indiana Division of R. A. C. is the only organization to have supplied the tool shop with the four vital elements of (1) complete loft data, (2) bolted model sections, (3) complete drawings, (4) tool expediters, ready to answer any question.

The loft data came through on templets of duraluminum, steel and lately of fiber with full standards accurately established thereon photographically. This process was described by the writer in "Templet Making Shortcuts", STEEL, Nov. 23, 1942. Mr. Dubusker says that such loft data photographically expressed on fiber keeps properly within tolerances specified.

Provided with these bolted model sections, tool makers could see at a glance what tool requirements were. They did not have to start cold from the drawings. These proved better references than even isometric drawings . . . for they had the actual unit in full dimension as reference. Complete tool drawings were provided. As tooling progressed, added information was supplied by R. A. C., Farmingdale. Expediters, one to each tool plant and clearing through Mr. Norton, were instantly at hand to smooth out all problems without delay.

The result has been that Thunderbolt fuselage construction resembles assembling Erector sets. Holes are pierced full size. There isn't a solitary part that is not tooled. Blanking, forming, piercing dies cover everything. Parts are 100 per cent interchangeable. There is little routing, no burring or filing. In assembling, the part is matched to pre-pierced full-size holes and riveted. R. A. C. was the first to attempt this complete tooling, and it is 100 per cent.

While this program was going along, the Indiana Division began to build hand tooled models in the new plant. It brought supervision from Farmingdale and production was started, using such facilities as were at hand, the new tooling being brought in and installed as fast as completed.

Aimed at Something New

Mr. Dubusker made a ten-strike in selecting Allen Engineering Co. "The old aircraft designers love their old ideas, and we were aiming at something new. It would have been hard to pull them away from rutted ideas. No matter how impossible, it had to be done. We wanted a clear-minded, neutral type of engineering that was unencumbered by tradition, that was aware of all the newest in automotive tool design, and who realized our new responsibilities. The result shows the wisdom of this viewpoint," Mr. Dubusker remarked.

Elimination of all hand work in fitting, trimming and burring when tooling is completed will effect important reductions in labor cost. Resort to older methods for first production and training caused continuance of hand methods until tooling was complete. The entire plant is conveyorized; both in the manufacture of fuselage parts and assembly. Engine and assembly storage cabinets are at the stations on the progressive assembly lines within arm's reach. Full craneways serve all lines.

There are over 2800 tools involved in fuselage parts. Each tool had to be specially designed. The tool storage is a huge department containing scores of unusual shapes, odd forms, unusual dies, which indicate many tooling accomplishments that hitherto had been considered impossible.

The principle is to assemble from subassembly to main assembly; throwing as many people around the first as possible to keep workers out of each other's way on the final conveyor lines. All forms are pressed, blanked, pierced to size. There is no skin filing or hand work. Thus the assembly is very simple, merely co-ordinating to full sized holes and riveting. Fixtures are all quick-acting and designed for swift assembly. Every known automotive device has been used —levers, tread suspension, precision

(*Please turn to Page* 132)

HERE'S HOW To . . "Keep 'em Running"

With repair parts impossible or extremely difficult to obtain, metal spraying proves a most valuable "tool" in rejuvenating worn equipment. Some rebuilt parts actually last longer than new ones

PRESENT scarcities of replacement parts and materials coupled with extremely severe operating conditions have placed an added burden on industry in maintaining its production facilities at peak efficiency.

In many cases it is practically impossible to obtain replacement parts or only after extremely long delays and therefore many companies have found it expedient to resort to other measures.

The process of spraying molten metal on worn surfaces has proved to be one practical solution for this difficult maintenance problem, having the advantages of effecting substantial savings in the cost of replacing parts and, more importantly, making possible the placing of equipment back in operation after comparatively brief shutdowns. In fact, the process may be regarded as a standard maintenance "tool" rather than an expedient keyed to the present national emergency.

In this article, operations in the Newark, N. J. plant of Public Service Coordinated Transport will be described as an outstanding example of the way in which the metallizing process is being utilized in maintaining equipment. Of course, the process is just as adaptable to industrial equipment, such as lathe and drill press parts, motor shafts, pistons, turbine parts, bearing housings and the like.

Inasmuch as the public carriers of New Jersey are located in the center of one of the most important war plant areas in the nation they are faced with the most gigantic transportation job in their history. Public Service, largest interest, serves 375 municipalities with 3500 motor vehicles and 246 street cars. In rush hours every one of these vehicles not undergoing repairs must be pressed into service and it means that repair time must be held at a minimum and at the same time use of replacement parts and materials must be restricted.

The company began using the metallizing process for salvaging worn parts in a small way about two years ago but today is employing it extensively. Moreover, it now is being used for rejuvenating reciprocating and rotating bus and street car parts which previously could not be repaired by any method.

Bus wheel hubs are one of the large items of maintenance, the points of wear being the inner bearing surfaces. These surfaces are prepared for spraying by first turning in a lathe with a rough cut-

Fig. 1. (Right)—Parts regularly rebuilt by metallizing and shown here are generator housing, wheel hub, clutch shaft and lever assembly, ball bearing cage and transmission shaft. All photos courtesy Metallizing Co. of America

Fig. 2. (Lower left, center)—Bus parts in various stages of metallizing, including air compressor crankshafts, drive shaft yokes, clutch throwout shaft and lever assembly, transmission shaft, differential pinion shaft and universal joint crosses

Fig. 3—(Directly below) Spraying steel on worn bearing surfaces of bus wheel hubs

Fig. 4. (Directly below)—Grinding metallized crankshaft bearing surfaces down to required diameters

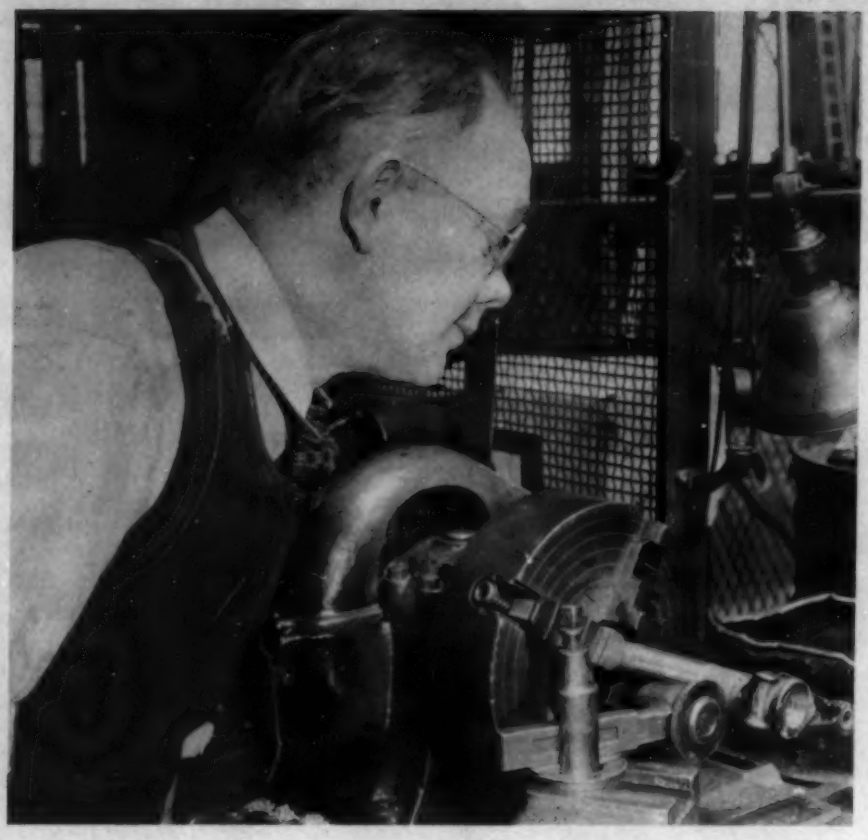


Fig. 5—Rotary tool being used for roughing surface of bus clutch throwout shaft and lever assembly prior to metallizing

ter after which the surfaces are roughened further with a rotary shaft tool. Spraying with steel is the next step while the hub is being rotated slowly in a lathe, conventional commercial equipment being used. In the final operation, a Carboloy tool is used for turning down the inner surface to the proper dimension.

Public Service finds it particularly advantageous to rebuild wheel hubs, since the operation may be performed in a minimum of time and at less than replacement cost even if the hubs were freely available from parts manufacturers. An added advantage is the fact that the hubs may be rebuilt a number of times, thus entailing further savings.

Salvage Clutch Parts

Bus clutch throwout shaft and lever assemblies are salvaged in somewhat the same manner although fewer operations are required. In the case of these assemblies, the end at the opposite end of the lever is placed in a lathe and the bearing surface roughened with a rotary shaft tool. Steel then is sprayed on the surface which subsequently is ground down to proper diameter with a Norton grinder using a 3846/K5/BE wheel.

In rebuilding air compressor shafts, Public Service finds it advantageous to build up the two bearing surfaces extra thick so they may be reground three times while in service and before respraying again is necessary. In order to allow for the thicker coating and because of the toughness of the base metal an extra deep cut is made by grinding in preparing the shaft for resurfacing. Following the grinding operation, the shaft is grit blasted. It then is sprayed and ground down to fit the connecting rod bearings.

As previously noted, the bearing surfaces may be ground down two additional times and refitted to the rod bearings before respraying is necessary, thus providing the advantage of additional economies.

Bus engine crankshafts are restored for further service in somewhat the same manner as compressor shafts except, of course, there are more bearing surfaces requiring processing. Extra deep undercuts are made so that the three regrinds may be made during the period the shaft is in service and prior to the next spraying operation.

After the undercuts are made, the surfaces are prepared for metal spraying with steel by grit blasting. Bearing surfaces then are ground to size on a Norton grinder. Experience has shown that these crankshafts stand up well in service.

Plant operators will find that the bearing surfaces of shafts for practically any type of service may be built up in a similar manner with the attendant advantages of reducing down-time of equipment and savings on cost of replacement parts.

Many operators also faced with the problem of maintaining equipment in other respects probably will obtain some practical hints from Public Service's experiments with reconstruction of bus transmission cases. These transmission cases have two bearing surfaces which are subjected to considerable wear and it was found that welding and other methods of building up the worn surfaces usually resulted in warping or cracking the cases because of the heat applied.

The company now follows the practice of building up the surfaces with sprayed steel. But, in order to properly anchor the added material, a dovetail is made in the original bearing surface, leaving a slot which is nine-tenths the width of the surface. After the steel is sprayed on it is machined down to proper size on a lathe using a Carboloy tool mounted on a boring bar.

As will be noted from the accompanying illustrations, Public Service has extended the spraying process to rebuilding quite a number of parts, including transmission shafts, differential pinion shafts, universal joint crosses, driveshaft yokes, ball bearing races and the like, in addition to the parts discussed specifically. Those encountering similar maintenance problems, especially in these difficult times, will find many inherent advantages in the process.

Founders Group Publishes Occupational Rating Plan

An occupational merit rating system prepared by Gottfrid Olson, foundry engineer, was published recently in booklet form by the National Founders Association, Chicago, under the heading "Occupational Rating Simplified for Foundries."

A plan is offered by which an equitable wage structure may be built. Details are clearly set forth and summarized in an occupational rating schedule which makes it unnecessary to wade through a maze of figures.

The booklet is divided into ten brief sections containing principally a definition of occupational rating; rating as a tool in production control; rating factors and their interpretation; determination of values and basis for wage differentials; discussion of the "going rate" bogey; occupational rating schedule and classifications by factors.

A section with graphs effectively illustrates schooling and training requirements; skill, versatility and job knowledge studies are graphed, as are degrees of responsibility, working conditions and wage group classifications.

FREE

New "Copper Guide" for war industries

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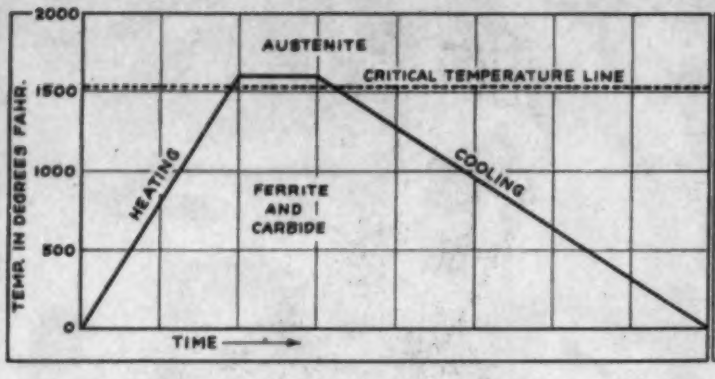


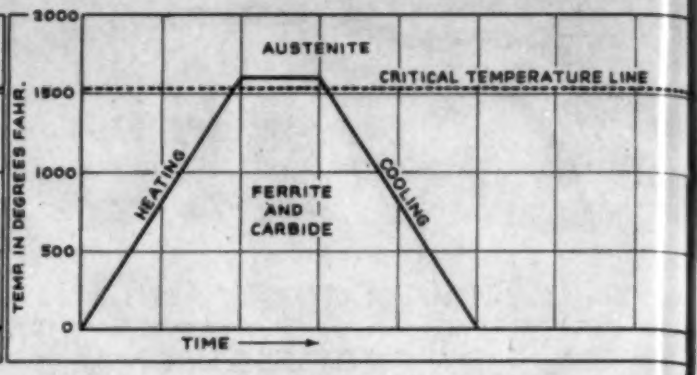


Fig. 1. (Left)—Typical heat-treating conditions for annealing
Fig. 2. (Right)—Typical heat-treating conditions for normalizing

STRESS RELIEVING

In Welded Construction

What is stress relieving; how does it differ from annealing or normalizing; where does tempering come in; what is the significance of these treatments and what are the purposes and advantages of each?

By HAROLD LAWRENCE
Metallurgist and Welding Engineer

ARMAMENT designs have brought some strange steels into the welding scene. Many of these are of such chemical composition as would ordinarily put them outside the pale of weldability. Still the needs of the armed forces have to be satisfied, leaving no choice for the welding engineer but to learn how to weld and heat treat his structures.

Quenching and tempering are used in a limited number of weldments while *stress relieving* is specified for many articles of ordnance. And the effect of the stress relieving cycle brings many problems, because a narrow range of tensile properties must be satisfied after the stresses have been reduced by heat treatment.

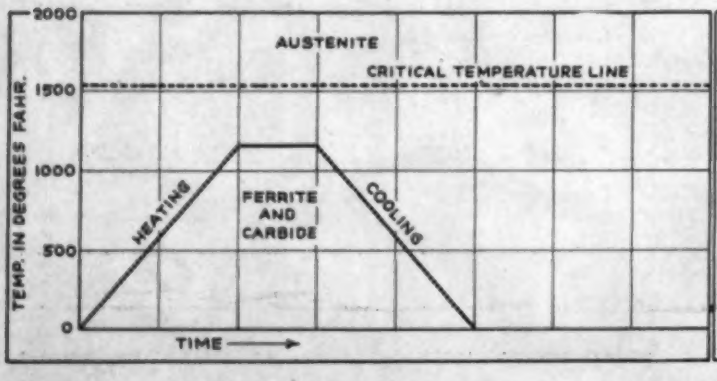
For the sake of proper orientation, stress relieving will be considered in its relationship to other heating methods that are in common use to lower residual stresses. There are four basic processes —*annealing, normalizing, stress relieving* and *drawing*. Each will be discussed in detail.

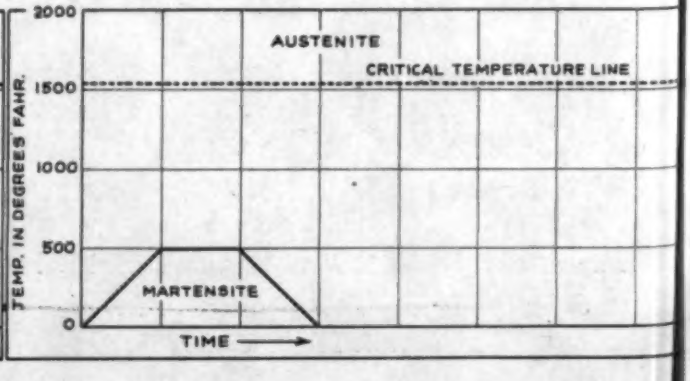
Annealing, or full annealing, as it is sometimes called, is a heat treatment that brings steel above the critical or recrystallization temperature, followed by slow cooling. This cycle is illustrated in Fig. 1. The original structure consisting of ferrite and carbide is heated slowly to a point about 100 degrees Fahr. above the critical temperature line. Below this line the steel is magnetic while the iron is in a form that can hold little carbon in solution. Above the line the iron is in a non-magnetic state while the crystal form is one which allows considerable carbon to be held in solid solution. The high-temperature crystal formation of steel is called austenite. Thus annealing means the transformation upon heating to a temperature above the critical of one crystalline arrangement to another.

Slow cooling, almost always done in a furnace, permits the re-establishment of new crystal containing ferrite and carbide but characterized by a substantially stress-free condition. Annealing, in addition to removing internal stress, results in a steel of lower strength and higher ductility.

Normalizing, shown in Fig. 2, is quite similar to annealing. Both the heating and the holding periods are identical with those for annealing. The only difference is the rate of cooling, for cooling in still air rather than in a furnace means the formation of smaller crystals. The more rapid cooling associated with

Fig. 3. (Left)—Typical heat-treating conditions for stress relieving. Compare with Figs. 1 and 2
Fig. 4. (Right)—Typical heat-treating conditions for tempering or drawing operations

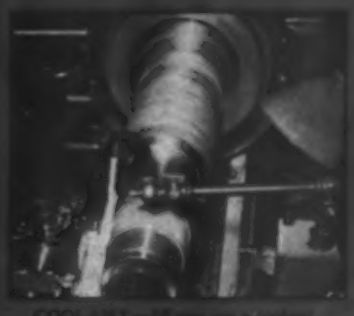




6 STEPS TOWARD TOP PERFORMANCE, WITH CARBIDES, WHEN YOU *Cut Steel*

CUT AT HIGH SPEEDS—For top performance on the average steel-cutting job, don't cut at speeds less than 300 feet per minute. Slow speeds often cause failure.

USE CORRECT CHIP BREAKER—When you break chips, break them right. Fit breaker to the job. The ground-in step-type shown is usually best.



COOLANT—If you use a coolant, provide a heavy, continuous stream, preferably under pressure. If you can't provide ample coolant, it is better to cut dry.

KEEP TOOLS SHARP—Avoid running tools until excessively dull. This causes breakage or drastically shortened tool life. Grind cuts at regular intervals for best results.

PROVIDE RIGID SET-UP—Keep tools at absolute minimum overhang necessary to clear work. Chuck part firmly. Rigidity is important with carbides.

FEEDS—For medium and heavy cuts on steel, feed from not less than .010" per revolution, and preferably .015" to .025". Light feeds "glaze" tool, causing rapid dulling.

● Important in getting top performance, when cutting steel with carbides, are the six steps shown above. When correctly applied, carbide tools produce results far surpassing the performance of ordinary tools. They operate at machine speeds as high as 4 to 5 times faster than ordinary tools, stay sharp up to 10 times longer, and increase output often as much as 300%.

Important, too, is the carbide you use. When you select from the complete line of carbides produced by Carboloy Company, you get the best type for your particular job—whether it be the popularly designated "titanium carbides", "tantalum carbides", "tungsten carbides"—or "tri-carbide" grades.

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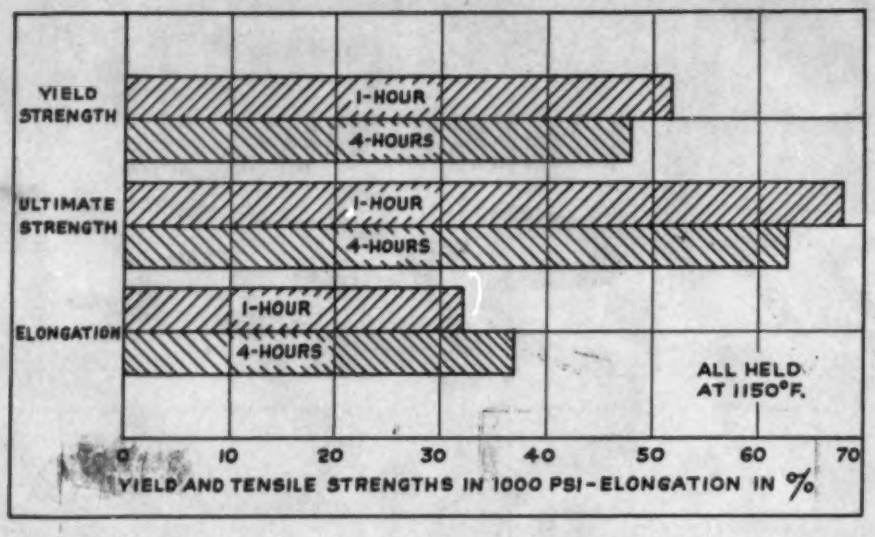

Fig. 5—Effect of holding times on physical properties of welds. Note all were held at same temperature —1150 degrees Fahr.

normalizing yields a structure with greater strength and less ductility than is the case with annealing.

Often normalizing is specified on heavy steel sections as part of the manufacturing process at the steel mill. The finer grained product is desired for its better impact strength as measured by the Charpy and Izod tests.

Stress Relieving: In Fig. 3, the third heat-treating process, stress relieving is shown. This treatment, which will be described in greater detail later, consists in slowly heating a weldment to 1150 degrees Fahr. within plus or minus 25 degrees Fahr. without introducing any recrystallization. Sometimes stress relieving is loosely spoken of as stress relief annealing. This practice ought to be discouraged as metallurgists prefer to reserve the term *annealing* for heating that is carried out above the critical temperature line. Stress relieving lowers the strength and increases the ductility of carbon steels but may have a noticeably different effect with the low alloy group.

Tempering: Fourth and last of the treatments used to relieve stresses is tempering or drawing. The term *tempering* is preferred. Tempering is used to improve the ductility and toughness of those structures that have been quenched to form martensite. Martensitic structures are unstable because of cooling at a rate that prevented the carbide from separating from the ferrite as it normally would do.

Tempering, see Fig. 4, is carried out far below the critical temperature. Because of the heating, carbon is allowed to free itself from the supersaturated, unstable martensitic state and will be found in small spheroidal form. A tempering operation reduces the hardness and strength of the steel but imparts ductility and toughness in a degree that makes the steel serviceable. For example a chisel used for chipping welded structures would be too brittle to withstand the impact of the pneumatic hammer unless both the shank and the point are given suitable tempering. Often the shank is tempered at 600 degrees Fahr. for one hour while the point is tempered at 400 degrees Fahr. for one hour.

Before going into the discussion of stress relieving, mention might be made of the use of normalizing to save a weldment that might otherwise have had to be scrapped. A large cylindrical section of alloy steel had been welded and X-rayed before an attached test plate was tested. The X-ray showed a perfectly sound structure without any hint of gas, slag or cracks.

Upon testing, the bend specimen broke in two with a brittle fracture before a 5-degree angle had been reached. Obviously something was wrong. Microscopic examination revealed martensite in the heat-affected zone.

The whole cylinder was loaded into a furnace and normalized. Subsequent microscopic examination showed a ferrite and carbide structure that is known to be ductile. The second bend specimen which had been heat treated with the cylinder bent 180 degrees. Thus was heat treating used to remedy a poor structure that had resulted from an improper welding procedure.

Many present day weldments are stress relieved to aid the machining operations that follow the welding. If stress relieving were not practiced, the structures would distort during the machining. The effect might be disastrous if such distortion were on a welded diesel engine frame which had been fabricated to extremely close tolerances for the purpose of eliminating excess machining.

In some types of service, stress relieving is necessary to avoid premature fatigue failure. What rules establish the need for stress relieving are rather well understood by designers. That residual welding stresses and welding sequence are of fundamental importance was reemphasized in the case of the SCHENECTADY break-up, although these factors are kept in line with good control. But this article is not so much concerned

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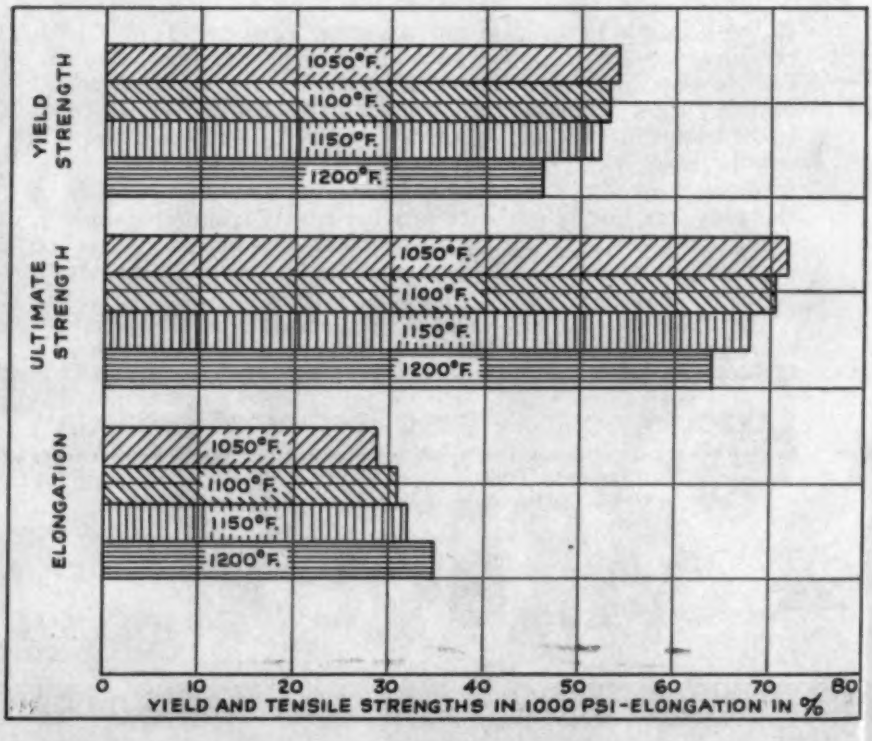

Fig. 6—Effect of different holding temperatures on physical properties of welds

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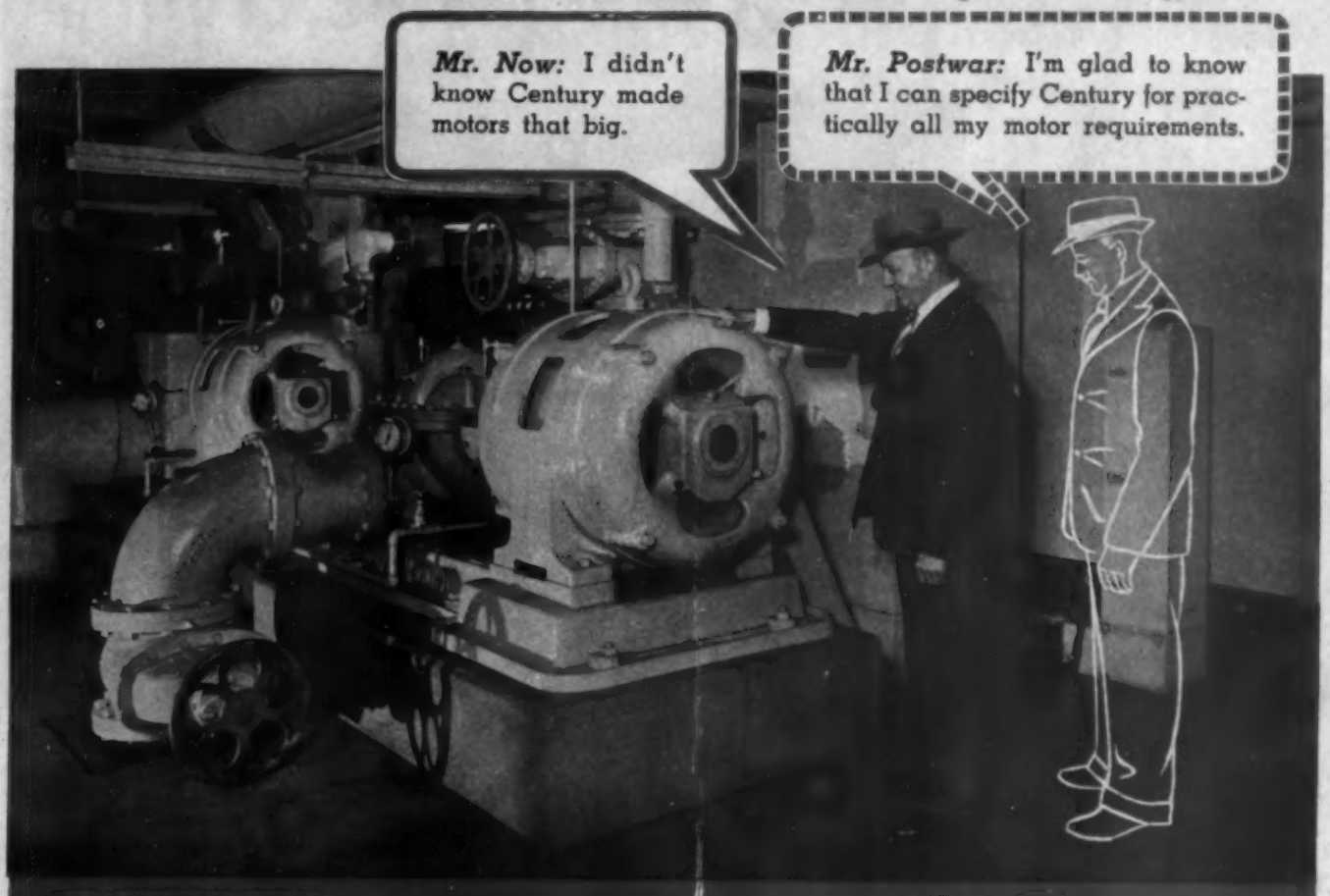
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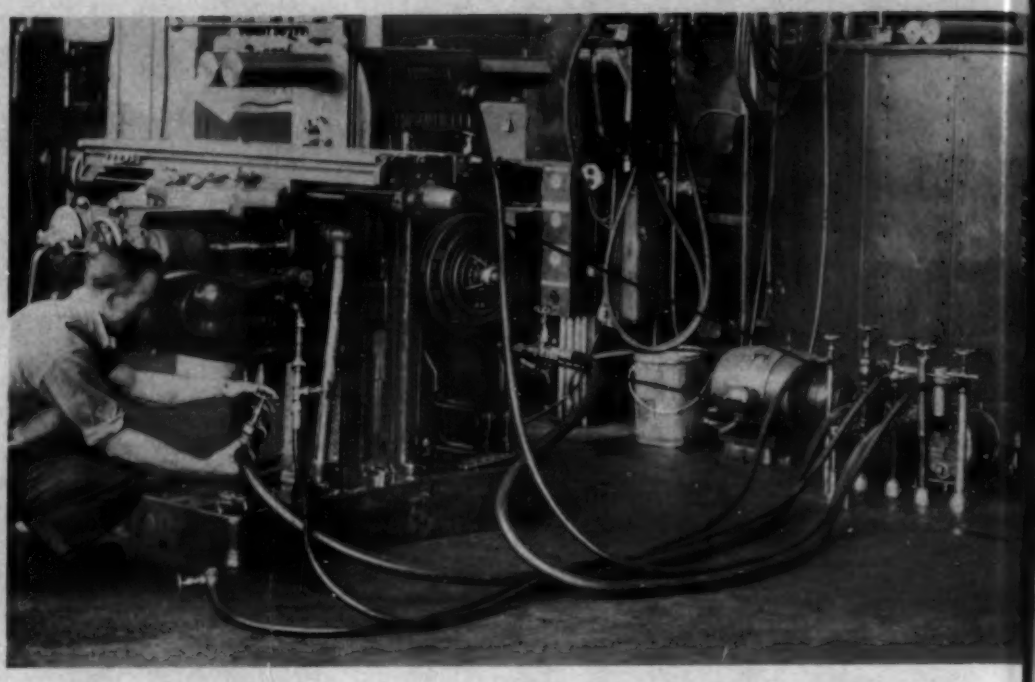
By C. H. HOCHMUTH
Assistant Works Manager
Kearney & Trecker Corp.
Milwaukee

CLEAN INSIDE, TOO

AFTER MUCH time and money have been spent in grinding and machining many of the parts of a machine tool to extremely close tolerances, it is annoying to find that scratches or rough spots have developed on these surfaces, owing to the presence of dirt that has come from the inside of the machine housing or some other part of the machine during handling or shipping.

Having experienced this condition many times, we decided that all housings and other voids in the machine should be thoroughly cleaned so that dirt or grime would not be present anywhere, even in those places where it could not be seen. This would make it easier to keep the bearings, gears, and other precision-made parts in perfect condition.



Flushing station includes facilities for operating the machine being cleaned, several flexible hose lines with connectors, storage tank and motor-driven pumps. Note push-button control station at extreme right

Machine tools must turn out work of extremely high accuracy, so all sliding surfaces as well as surfaces holding the work must be gaged to close tolerances and polished. The same is true of the many gears, cams, bearings and other parts. Many such surfaces are ground to tolerances of less than a thousandth of an inch, and deflections with applied loads must be kept within limits measurable only with very sensitive tools.

Scoring of these surfaces by the presence of dirt contributes to inaccurate work, inasmuch as damage of this nature, even though slight, may increase a tolerance of, say, 0.0004-inch to several times that figure.

Protected by Flushing with Oil

To maintain extremely close tolerances, great care is exercised in gaging and testing all precision-made parts and in handling parts and assemblies. Polished surfaces are protected by using soft rope slings. Where wire rope can be used, only preformed rope is employed since it is not so inclined to "barb" when worn and therefore it does not puncture the cloth pads used as cushion between it and the load.

To insure protection of all surfaces, we have eliminated all dirt and grit *by flushing out all parts of the machine with oil under pressure*, which is then followed by the application of clean machine oil to all moving parts and interior surfaces. Since adopting this method, we have virtually eliminated all trouble caused by dirt or grime working its way into bearings, gears, and the like from the inside of the machine.

The clean flushing oil is pumped from a tank and forced into the machine under 40-pounds pressure, then is returned to a settling tank, from where it passes through a centrifuge and on to the clean-oil tank, thus completing the circuit. After 15 minutes of this operation, the flushing oil is drained out of the machine and is replaced with clean machine oil.

During the application of the flushing oil and the machine oil, the machine is kept in operation. The flushing oil first passes through the bearings and the internal gearing, as well as through the hydraulic control unit on machines equipped with this device. The working parts throw the oil against the sides of the housing, washing all dirt and grime into a settling pocket. From here the oil, carrying all sediment and moisture out of the machine, flows through a pipe into the settling compartment of the settling tank. This compartment is separated from the remainder of the tank by a vertical partition, over which the oil flows into the second compartment. A clean-out is provided at the bottom of the settling compartment.

On the way to the tank of cleaned oil, the oil passes through the centrifuge, which is located between the two tanks. Alongside the cleaned oil tank is the tank of machine oil.

Tanks Cleaned Every Four Weeks

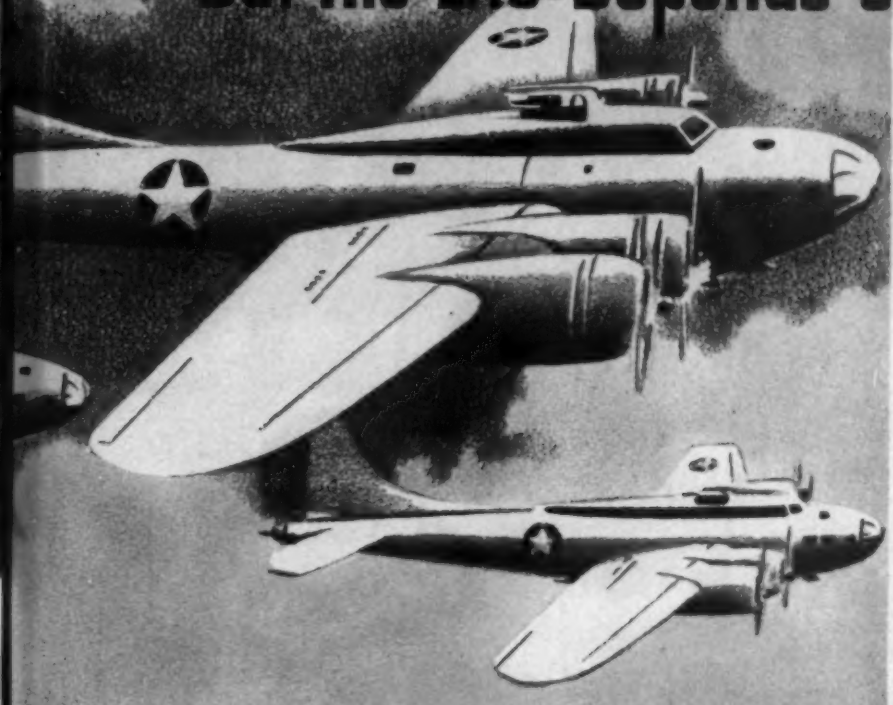
The piping from all tanks leads under the floor to two flushing stations, allowing two machines to be flushed at the same time. At the flushing stations the pipes emerge from the floor and are provided with control valves and with nozzles for attaching 1½-inch neoprene hoses. The pipe from the tank of cleaned flushing oil is broken for the insertion of the pump that forces the oil through the machine.

Every four weeks the flushing oil tanks are thoroughly cleaned out and the sediment removed from the settling compartment. Though our plant is operating 24 hours a day, 7 days a week, we generally find that changing the oil, which requires 4 or 5 hours, can be accomplished on Sundays without upsetting our production schedule. At each change, 12 barrels or about 650 gallons of fresh flushing oil is required, to which is added 10 gallons of pine oil. The tank of machine oil is filled every week, using about a barrel or 55 gallons at each filling.

The adoption of this method of flush-

(*Please turn to Page* 134)

Gunner Gates Never Heard of These Men... But His Life Depends on Their Work!



Cutting Tool Industry Meets "Impossible" Demands of a Fighting America!....

It took plenty of the right kinds of cutting tools to get America's war production where it is today! Cutting tools for the machine tools that turn out deadly guns, fast planes, mighty tanks, avalanches of hard-hitting weapons. The stuff victory is made of.

Producing plenty of the right kinds of cutting tools . . . *right on time* . . . posed many an "impossible" problem. Substitute materials had to be found . . . Production facilities had to be expanded tremendously. Then there was the man-power shortage; and serious engineering problems also presented stumbling blocks.

The engineers of the cutting tool industry found the answers fast by tapping rich resources of years of know-how experience. Typical of these "combined" operations is the meeting of Barber-Colman engineers pictured at left. Out of just such conversations came war-vital achievements.

For instance Barber-Colman engineers developed a series of special taper cartridge chambering reamers and a fixture for mechanically sharpening them which saved hundreds of man-hours. Hand stoning was banished and total sharpening time reduced from as much as 6 hours to approximately 30 minutes.

Doing the impossible has become a habit with the men and women of Barber-Colman. Today, we're proud to be turning out many times more and finer cutting tools for more war industries than ever before. Tomorrow, this same kind of performance shall be yours to command in solving problems of production for life after victory.

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Hobs • Milling Cutters • Reamers • Special Tools • Sharpening Machines

By F. L. SPANGLER
Mechanical Engineer

Above—Arc welding can be used to advantage to rebuild worn sheaves regardless of how badly they have been damaged

Left—Metal spraying is one way to deposit metal for building up worn sheaves

Reclaiming WORN SHEAVES

SINCE STEEL or iron sheaves are not easily obtained these days, it behooves everyone to make all cable sheaves or drums last as long as possible. Frequently old sheaves can be reclaimed and kept in use by building up the worn grooves. A common method for building up worn sheave grooves is to deposit metal in the worn grooves by either arc welding or by metal spraying. Where the sheave groove is badly worn, flat spots or places of uneven wear can be built up by welding and then the welding arc, or the metal spraying gun, used to apply the final layer over the entire wearing surface.

The use of too soft a material, such as cast iron, is often the cause of undue wear of sheaves. Originally soft sheave grooves built up with a hard metal have given as much as five times the original wear. Hence, the reclaimed sheave might be a decided improvement over the new. Here, too, is proof that harder sheaves, such as manganese, might well be economical in the long run. A long-wearing sheave saves more steel than is at once apparent, for in addition to saving precious sheave metal, it is much easier on the rope than is a sheave constructed of softer material.

However, wire rope in itself can be a needlessly destructive element to sheaves. Ropes which tend to twist, squirm or rotate as they pass over sheaves cause far more rapid sheave-groove wear than where such twisting is absent. Because of the elimination of torsional stresses in preformed rope, this type of rope does not tend to twist or rotate in sheave grooves and thus reduces groove wear as well as rope wear. It has long been recognized that the use of hard sheaves, with preformed wire rope, will effect pronounced savings in replacement or reclamation.

Approved methods of building up worn sheave grooves by arc welding and by metal spraying with advantages of each process can be briefly stated as follows:

Arc Welding

How to Apply:

—Use an electrode that is suitable for depositing on the particular metal of which the sheave is made, and where practical, select an electrode that will give a hard surface without heat treatment. With a steel sheave use a manganese-steel electrode or a self-hardening electrode, deposited in a layer not more than ⅛-inch thick. Where the wear is greater, fill in with a carbon-steel electrode before depositing the final layer of hard metal.

—Apply the metal by the skip weld method to minimize distortion.

—Finally, true up the groove.

Advantages:

—Can be applied to sheaves having even or uneven wear.

—Can be performed without removing the sheave, if necessary.

—Many users of wire rope are equipped to build up sheaves by welding.

—Deposit is very dense, contributing to long wear.

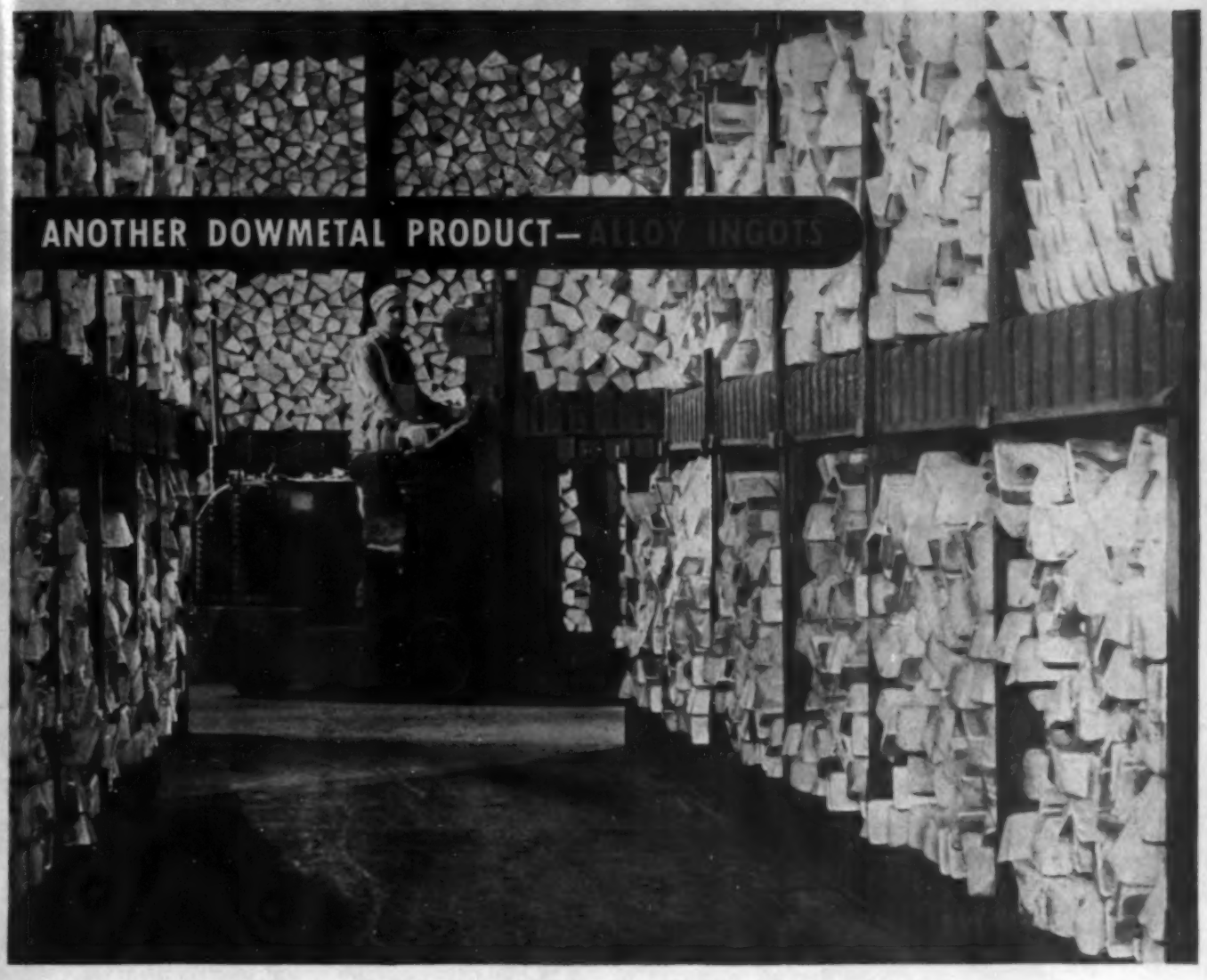
Metal Spraying

How to Apply:

—If uneven wear is present, build up to uniform contour by welding or by truing up on lathe.

—Prepare surface by blasting with sharp steel grit. After blasting keep surface clean. Do not allow hands to come into contact with the surface.

—Apply metal by rotating sheave in



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Twenty-seven years of research and experience go into every Dowmetal magnesium alloy ingot so that you who are entrusted to make vital sand, permanent mold and die castings can forget your alloy problems when you buy ingot from Dow.

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lathe with spray gun attached to tool post. Use 1.2 carbon wire.

Advantages:

—Can be used to give hard surface to cast iron sheaves as well as steel sheaves.

—Does not distort sheave if applied as directed above.

—Requires no truing up of sheave groove after application.

—Deposited metal is capable of absorbing rope lubricant, thereby retaining oil film on surface.

—Wearability of hard deposit increases life of sheave and rope.

Wet Belt Grinding Methods Are Described in Book

Under the title, "A New Precision Grinding Method," Porter-Cable Machine Co., Syracuse, N. Y., recently published a 32-page brochure covering many applications of the highspeed "wet-belt" abrasive system of finish machining without preliminary roughing.

Through development of a new type of specially processed cloth belt to which the abrasive grains are plastic bonded, it is possible to use coolant. This keeps work and belt from heating, eliminates flying grinding dust, and keeps the abrasive surface cleared of metal chips. This belt, which is skived on a basis and vulcanized together so as to give no "bump" at the joint, is backed up by a precision surface plate which makes it possible to grind parts directly "from the rough" to a high degree of accuracy and flatness as well as to fine finish. Because of the coolant, no heat distortion occurs.

The brochure, which is fully illustrated, describes a wide variety of operations, including free hand, table supported and fixture-held work on various materials, including plastics and ceramics as well as metals. The system is dealt with not only as a primary machining method, but also as supplementary to pressure casting, band sawing, shearing and pressing, forging and rotary cutting off in lathes and screw machines. Numerous examples illustrated and described will serve to guide in the setting up of other jobs of the same general characteristics.

Copies of this book are available free of charge to executives, engineers and production men who request it on their companies' letterheads.

Granular Silica Gel Protects Overseas Cargo

A quick-packaging technique for guns, planes, and machinery that prevents rusting and corrosion damage during the weeks and months these metal war implements lie in freighter holds and dockyards is described in *Chemical and Engineering News*, publication of the American Chemical Society, by Henry H. Wilkinson of Permutit Co., New York.

The technique is made possible by development of a chemical that not only sucks half its weight in moisture out of the damp cargo space air, but also signals workmen when the humidity inside a package reaches the point where rusting occurs.

The chemical is granular silica gel. It protects inside as well as outside surfaces of aircraft engines, machine guns, or other metal parts because the relative humidity of the entire package is kept below 20 per cent—at which range the chemical action of corrosion cannot take place.

According to the publication, silica gel granules do not swell, dissolve, or show any visible effects of the absorbing process. Their water-absorption is a simple physical action.

One of the advantages of the silica gel method, it is reported, is the elimination of guess work as to the "corrosion-proofness" of the package. Visible from the outside, enclosed in the package is a humidity indicator—a card containing cobalt-impregnated silica gel, which changes color as the air within the package changes in humidity.

When the air is dry, the impregnated granules are a deep blue, but as the humidity of the package increases, the granules change through violet to pink.

New Rotary Burring Tools Cut at High Speeds

Reduced burring time per part and considerably longer tool life are features of the new cemented-carbide burring tools, or rotary files, called Carburs, developed by Carbur Inc., Lincoln Park, Mich.

The result of five years of research and development work, the tools are said to be the first ever produced—having cutting teeth which are ground from the solid on special machines designed and built for the company.

The cemented-carbide heads are securely attached to the steel shanks by a new process employed by Carbur.

Providing a sharp cutting edge over a long period of time, the tools reduce burring time per part and generally increase efficiency in burring operations in all types of production.

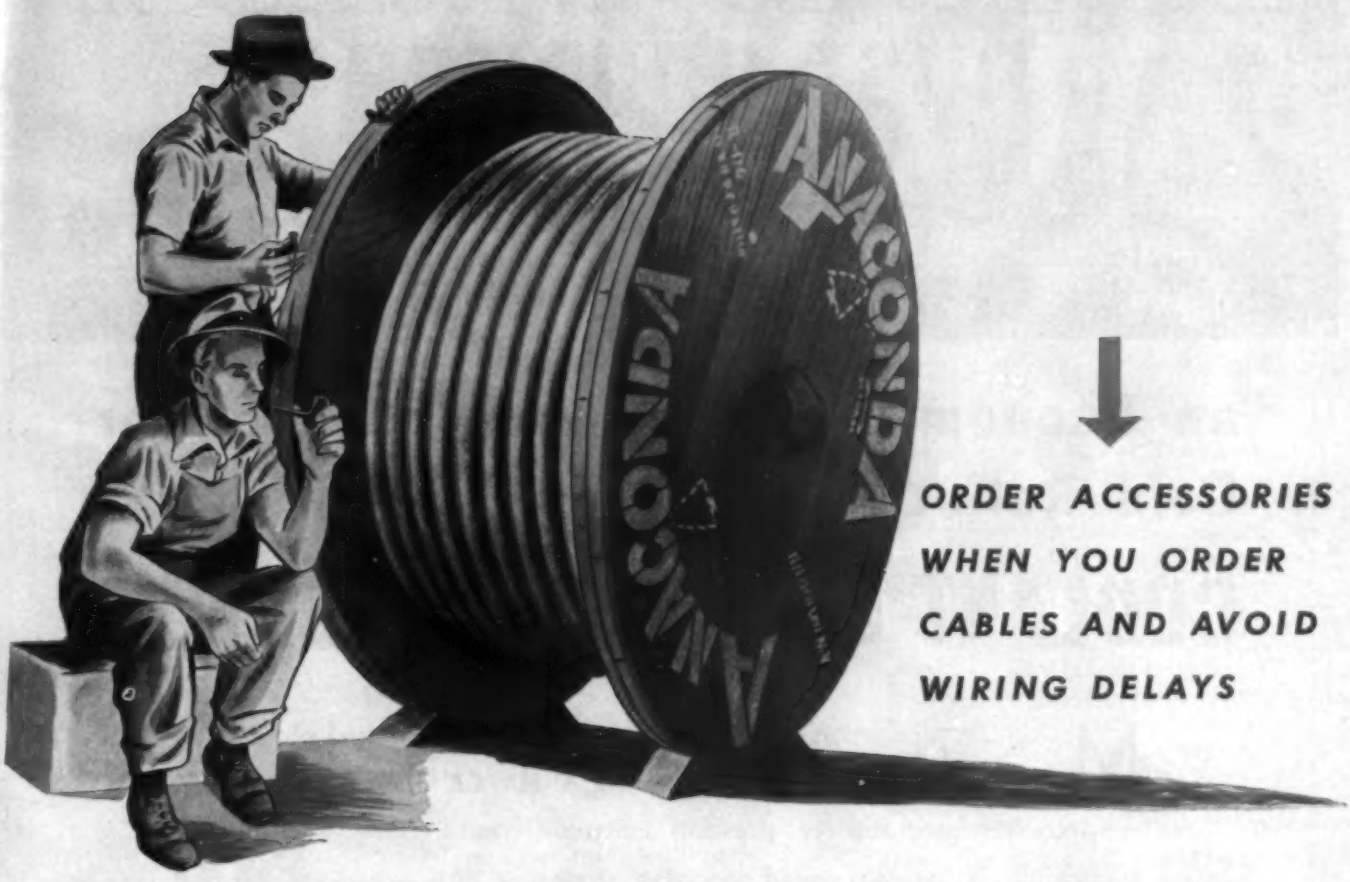
Among other advantages of the tools, less replacement is necessary and inventories can be reduced considerably. Tool sharpening is reduced in proportion to the life of the tool. In addition the new tools can be run at high speeds.

At present, the tools are being manufactured only in ball-end types in ⅜ and ½-inch sizes. The shanks are 0.250-inch diameter and the burring tools are 2½ inches over-all.

Other sizes and shapes are now under development and will be announced as production tests are completed, according to the company.

INDUSTRIAL ACK ACK: This automatic machine tool at the Mansfield, O., Westinghouse plant, in appearance resembling an automatic military weapon, belches out threaded aluminum rings that go into Army binoculars. Aluminum rods loaded into the machine's six "barrels" change into rings the size of napkin holders when automatic drills, threaders and cutting tools go into action. The "ammunition" is fed into the tube openings shown at the left, and the finished parts come out at the right. Each part is so perfect it checks to 0.0007-inch

War Time is Priceless!



ORDER ACCESSORIES WHEN YOU ORDER CABLES AND AVOID WIRING DELAYS

EVEN before the war, the common practice of waiting to order cable accessories until the cable for the job had been shipped frequently caused days of delay.

Today, however, it may even take a month or more before an accessories order can be approved and materials started on their way.

This holds up the wiring job unnecessarily. In the meantime, workers may be idle—and not just electricians alone, for other workers all along the line may be affected. Today, if never before, follow this wartime-saving practice:

1. Order accessories and cable at the same time —for delivery together.
2. When ordering unit package jointing material, include your order for terminals and potheads. If buried cables, remember joint boxes.

Every Anaconda unit package contains instructions and all materials required for the particular job. When ordering, please specify number of unit packages needed, operating voltage, size, number and shape of conductors, thickness and kind of insulation, thickness of lead sheath of cable.

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an Economical 2 Purpose Product for Cold Rolled Strip Mills . . . Acts as a

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Reclaiming
CARBIDE TOOL TIPS

. . . . by reducing to powder and re-sintering affords almost 100 per cent recovery of valuable tungsten carbides in tool tips no matter how badly tools are worn

TUNGSTEN is one of the strategic metals, being produced chiefly from ores imported from China. Since tremendous quantities of it are used for cutting tools and other purposes, it is essential that all scrap be reclaimed. The process described here is now being used in the Aircraft Engine Division of Ford Motor Co. to recover or reclaim tungsten carbide tools tips that have served their normal purpose.

The first step is the removal of the carbide tip from its steel shank. This is accomplished by holding the tool for one hour in a bath of concentrated nitric acid at a temperature of about 150 degrees Fahr. It is then removed from the acid bath and washed in water, and a slight tap then will loosen the carbide tip. The tips usually are slightly contaminated with iron and brazing material, which are removed in a bath composed of equal parts of nitric acid, hydrochloric acid and water.

Next the tips are washed in a caustic bath. Titanium and tantalum carbide tips must be separated out and this is accomplished by passing the tips through a hydrogen-atmosphere furnace at 240 degrees Cent., in which the titanium and tantalum carbide tips acquire a brownish color, while the tungsten carbide tips retain their light gray color. This allows the former to be readily recognized and separated out.

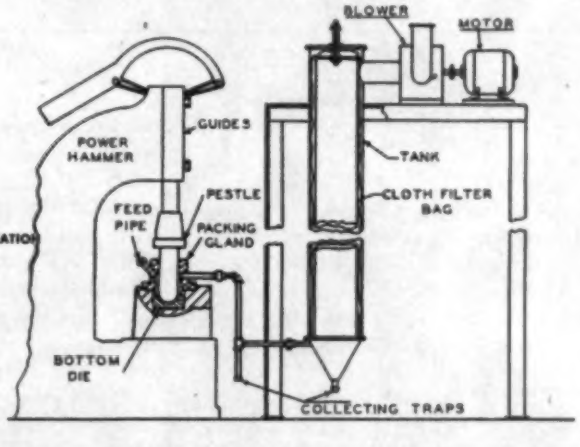
The tungsten carbide tips are next pulverized in a 100-pound Bradley power hammer, which operates at approximately 250 strokes per minute. A hardened steel mortar and a pestle are used on this hammer. The pestle reciprocates through a packing gland that prevents the escape of carbide dust. The carbide is fed into the mortar through an iron stand-pipe, and the pulverized product is drawn off by the air current of a centrifugal exhauster, through a cloth filter. The dust settles in a trap from which it is recovered. A cross section of the die and the collecting mechanism is shown in the accompanying illustration.

The pulverized tungsten carbide is now put into carbon boats and placed in a hydrogen-atmosphere furnace at 1500 degrees Fahr. for 20 minutes to reduce any oxides that may be present. The powder is then put through a 400-mesh sieve, and the portion that passes through is ready for further use. The part that does not pass through is fed back into the power hammer and repulverized. A binder consisting of a 3½ per cent solution of paraffin wax in trichlorethylene is added to the powdered carbide, and this mixture is dried in an oven at 140 degrees Fahr. for approximately 2 hours.

It is now ready for forming into shapes, and the mixture is compressed in suitable steel molds under a pressure of from 5 to 20 tons per square inch. While the higher pressure gives a somewhat higher density, it also tends to cause lamination, and for that reason it is necessary to use the lower pressure range in most cases.

The tungsten carbide thus compressed is placed in carbon boats and covered with aluminum oxide. After careful preheating to drive off the wax, it is "soft-sintered" at 1600 degrees Fahr. for 20 minutes. After this soft-sintering process, the carbide is "chalklike" and may be cut to any shape with a saw, file or grinding wheel. The stock is cut 17 per cent oversize in all directions to allow for the shrinkage which occurs in the final sintering operation. This final sintering is done in carbon boats, in which the carbide shapes are covered with flake graphite and passed through a hydrogen-atmosphere furnace at 2760 degrees Fahr. for 20 minutes at heat. The tungsten carbide shapes are now ready for brazing to tool shanks, into die holders, etc.

Note reclamation is practically 100 per cent for any carbides cut away during shaping of the new tool can be powdered and re-sintered. There is no need to lose any of the tungsten carbide material.



Diagrammatic layout showing equipment and pulverizing die for reclaiming scrap tungsten carbide from tool tips

From *Automotive and Aviation Industries.*

How To Burn Fuel Oil

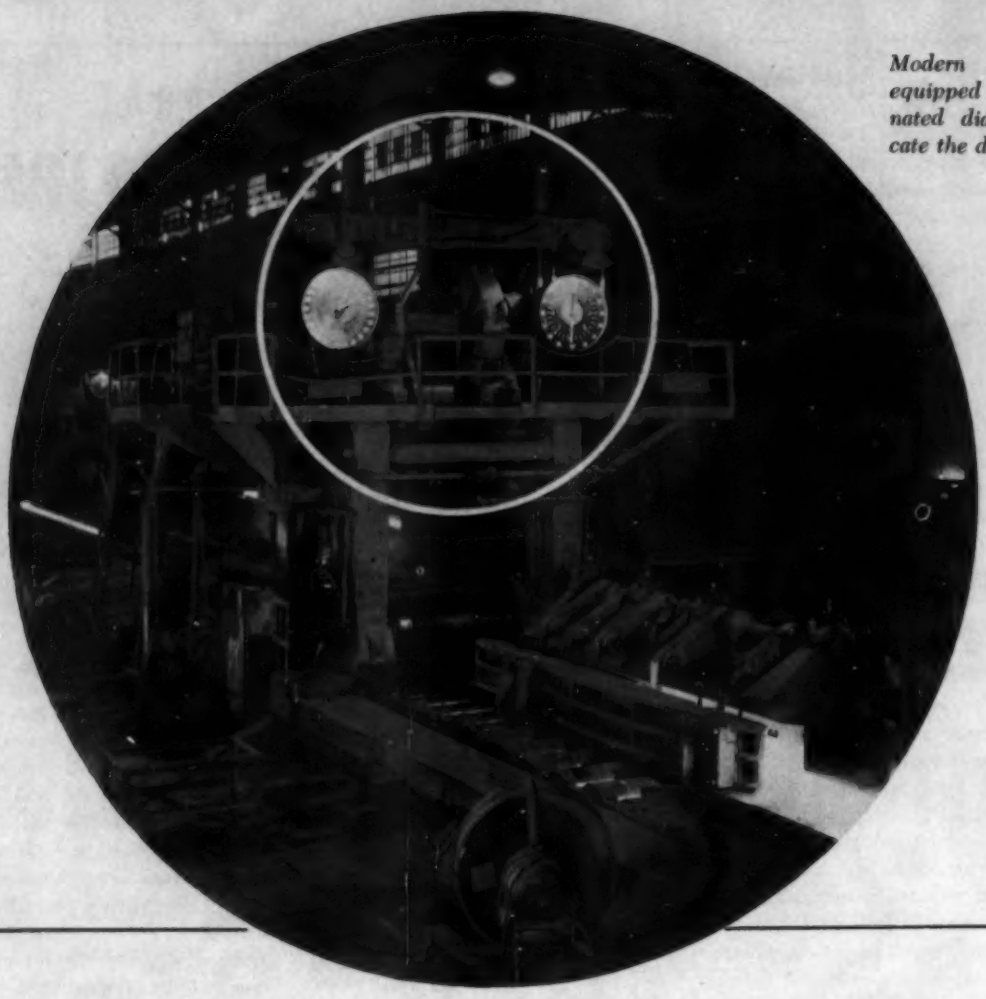
Fuel Oil and Its Combustion, fabrikoid, 45 pages, 5 x 7½ inches; published by North American Mfg. Co., 2910 East Seventy-fifth street, Cleveland 4, for $1.50.

This booklet was prepared by the company's research department for users of fuel oil. After a definition of the term as used in industry the writer proceeds to a discussion of crude oil constituents and classification, processing of crude oil and thermal properties of fuel oils.

The work then takes up the combustion of fuel oils and various factors that produce various results in the combustion process. These include grade or type of oil, atomization, degree of air-oil mixing, furnace temperature and type of burner block.

Aim of the booklet is to stress the necessity of knowing the combustion result desired and then proceeding in a logical way to select the type of fuel and combustion equipment that will give that result. Desired combustion results are becoming more exacting as to furnace atmosphere and temperature control, making it imperative that proper equipment and oil be used.

The book is practical and valuable to all users of oil fuels.



Modern blooming mill equipped with illuminated dials which indicate the distance between rolls

COUNTING DEVICES

Find Wide Use in Steel Industry

By S. H. FULLER
Pittsburgh Representative
Veeder-Root Inc.
Hartford, Conn.

USE of counting mechanisms in the steel industry begins with the ore. After the ore is dumped in the huge piles that ordinarily can be seen near blast furnaces, it is transferred to the stock-house bins and thence to skip cars which operate on an incline, and dump the charge in the top of the furnace. As these cars are unloaded, they are counted on a magnetic counter. This record serves two purposes: First, it measures the activity of the furnace and second, it enables a perpetual inventory of ore on hand to be kept with a reasonable degree of accuracy. Each car contains a definite amount of ore and it is an easy matter to determine the tonnage used by multiplying the number of cars dumped by the weight of each car.

Another application is at stripper building where a counter actuated by a grid-glow tube registers the number of ingots turned out. The light from the hot steel itself operates the counter, and again the idea is not only to measure the amount of work done, but to obtain a record of the tonnage produced. In the blooming mills, counters again are used to count the number of ingots leaving the soaking pits and fed to the rolls.

In the process of rolling, counters are probably used more than anywhere else in the mill. The gap between the rolls must be maintained with a high degree of accuracy, and this spread is made visible to the operator by means of counters. These are operated by a synchronous motor, wired in series to the motors operating the screwdowns on the heavy rolls. This installation is so accurate that the operator can read in 0.001-inch, on the face of the counter, the distance between the rolls, controlling the thickness of the steel. Two of these devices usually are installed on each roll and other such counters in a centralized location to indicate the thickness of the piece being reduced by each set of rolls.

In some cases it is necessary to remove scale and cracks from the surface of the product coming from the blooming mill in order to prevent defects in the commodities to which they are converted. The slabs or blooms usually are laid out side by side in a yard and carefully inspected. The inspector has a device that marks the defect, measures its length on a counter, and accumulates this total so that the amount of work necessary to clean up these defects is determined. After this inspection, men with air chisels follow the places marked by the inspector; in some mills the men are paid by the number of feet of chiseling they do.

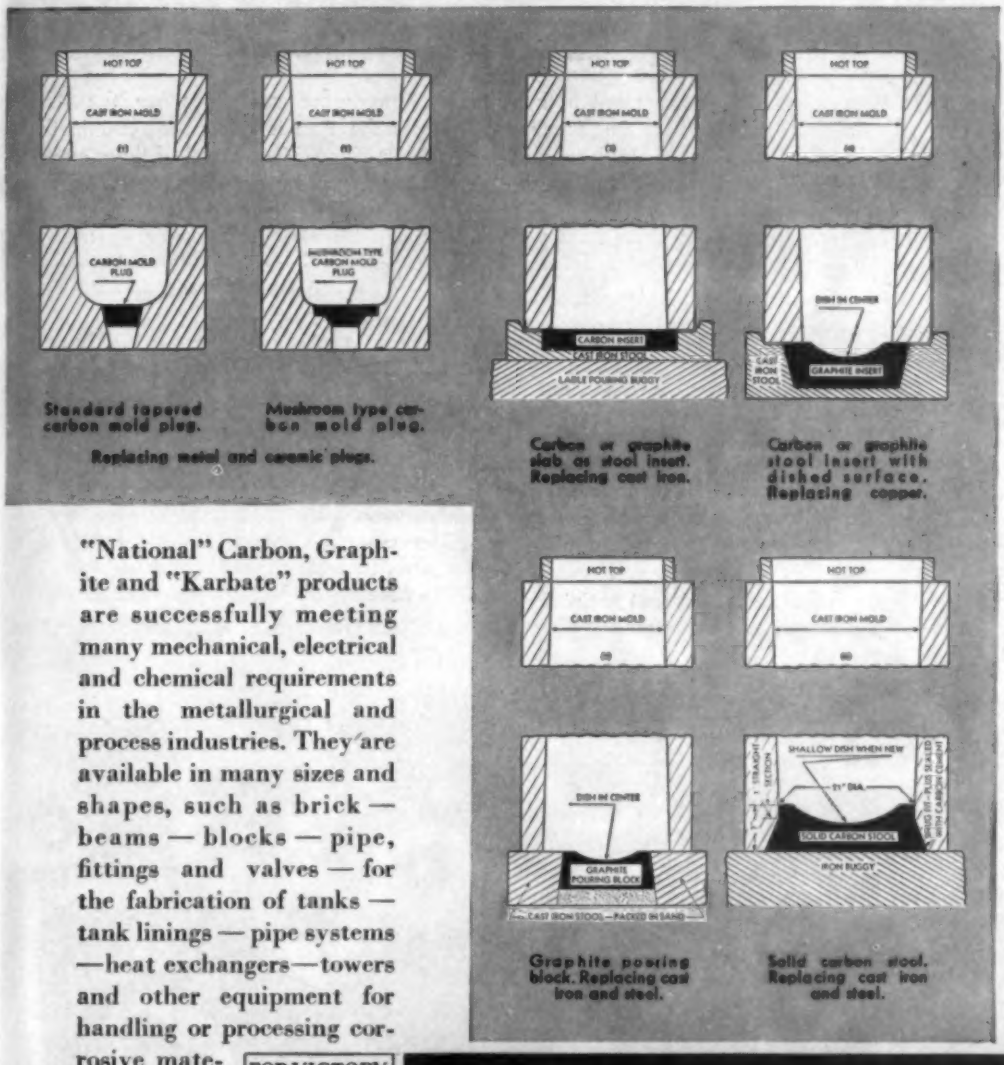
Where shapes are being rolled for construction purposes counters indicate the number of feet passing through the mill, both for the purpose of checking on

Where Severe Thermal Shock is a Factor

Use Carbon and Graphite

EXPERIENCE HAS PROVED THE STABILITY AND EFFECTIVENESS OF "NATIONAL" CARBON AND GRAPHITE PRODUCTS WHEREVER SEVERE THERMAL SHOCK IS ENCOUNTERED.

STRENGTH . . MINIMUM OF CRACKING, SPALLING AND STICKING . . FREEDOM FROM INCLUSIONS OF FOREIGN MATERIALS . . LIGHT WEIGHT . . LONG LIFE . . LOW COST



Standard tapered carbon mold plug. Mushroom type carbon mold plug. Replacing metal and ceramic plugs.

Carbon or graphite slab as stool insert. Replacing cast iron.

Carbon or graphite stool insert with dished surface. Replacing copper.

Graphite pouring block. Replacing cast iron and steel.

Solid carbon stool. Replacing cast iron and steel.

"National" Carbon, Graphite and "Karbate" products are successfully meeting many mechanical, electrical and chemical requirements in the metallurgical and process industries. They are available in many sizes and shapes, such as brick — beams — blocks — pipe, fittings and valves — for the fabrication of tanks — tank linings — pipe systems —heat exchangers—towers and other equipment for handling or processing corrosive materials. Write for complete information.

are important advantages offered by these materials in such applications as ingot mold plugs, stool inserts, stools and pouring blocks (see sketches of typical applications). Mold and stool life have been prolonged and other economies made possible.

STANDARD TAPERED MOLD PLUGS

Standard tapered mold plugs are available in two sizes:

$5\frac{13}{16}'' \times 5\frac{1}{4}'' \times 3''$

$5\frac{15}{16}'' \times 5\frac{9}{16}'' \times 3''$

Other sizes and shapes of mold plugs, as well as stool inserts, stools and pouring blocks can be supplied to meet any desired specification.

The words "National" and "Karbate" are trade-marks of National Carbon Company, Inc.

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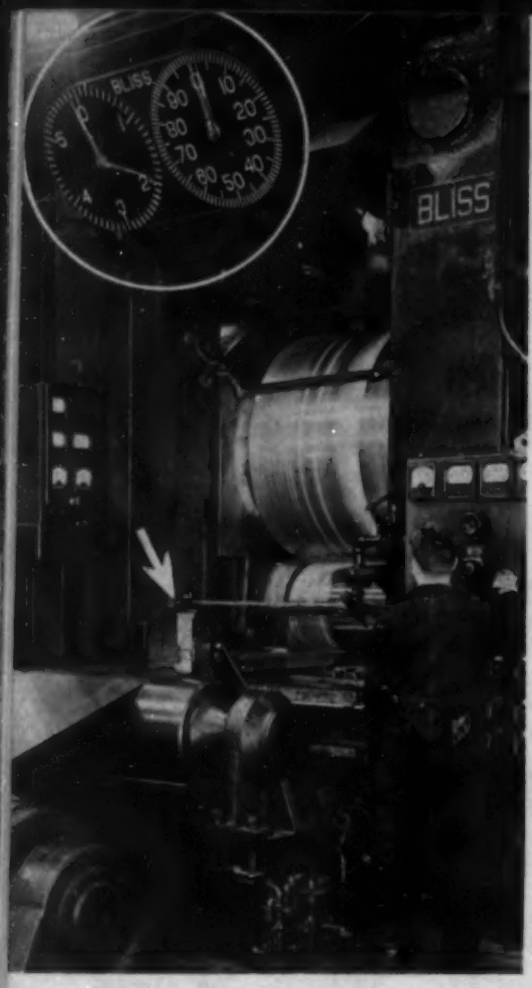


Reversing 54-inch cold strip mill. Micrometer gage is equipped with counting device indicated by arrow

men working and to prevent overruns of any particular size or shape. Shapes are cut to certain specified lengths by steel saws and counters register the number of cuts, providing a check both on the life of the saw and the work of the men operating the saw.

In both hot and cold rolling mills counters are used to measure the distance between the rolls, as has been indicated in blooming mill practice, but here in addition, the counters are attached to flying micrometers, which enable the roller to have visually before him the gage of the steel being rolled. In reversing cold mills, the steel is wound on reels as it passes back and forth between the rolls. This operation is repeated until the steel is the proper gage and texture. The number of wraps on a reel is measured on a counter, to assist the operator, reversing the rolls to know exactly how many wraps will come off that reel. By this arrangement he avoids the necessity of rethreading the piece in rolls if he should run the steel completely out.

When the steel is run through a finishing roll and wound on a reel as a finished product, the number of feet in the coil is measured by a counter that rides the surface of steel as it goes between the rolls, thus giving an accurate record. A ticket usually is placed in the coil showing the number of feet contained therein.

In making up shipments of various sizes, large coils of this steel first are sheared to width and then to length. Flying micrometers again are used in this process and, connected with the micrometers, are magnetic counters that indicate the number of sheets produced and the number of rejects, both over and under size. This micrometer-control operates three separate counters, showing the total sheets produced, the total under and over gage.

Indicates Tube Output

In the making of tubes, either drawn or welded counters are used to indicate total production, and on the cooling tables to count the number of pipes of any particular size. Skelp used in making welded pipe is counted both as to total production and the number of pieces. Counters are used to measure the speed of the rolls through which the steel passes.

Pipe is tested by means of water pressure. The pressure gage is set to the number of pounds desired, and when that point is reached by the water in the pipe, a contact is made that sets in operation a dash-pot that holds the pressure for a predetermined number of seconds. When the last contact is made, a magnetic counter is energized and counts the pipe, thus insuring a correct test and also recording the exact number of inspected pipe. If the pipe fails in the test it is not counted, or if the pressure is not maintained for the length of time required, the pipe is not counted. Payment is made on the basis of the counter register.

In wire mills many of the same applications as previously mentioned are found, and in addition, predetermining counters are used to determine the weight of each reel of wire, so that heavy reels of wire, of the same gage, weigh exactly the same. Prior to the use of counters, this weight would vary to such an extent that it was necessary to weigh each reel separately. The use of predetermining counters provides automatic control of this weight, that does not vary. In loading these reels, they are carried by conveyor either to warehouses or railroad cars, and counted automatically as they go, thus providing a record of the number of reels and the tonnage. Counters also are used in measuring wire through galvanizing units; in welding the copper to the steel cores of trolley wire; and to count the weight of ingredients in the processing of wire steel and sheets.

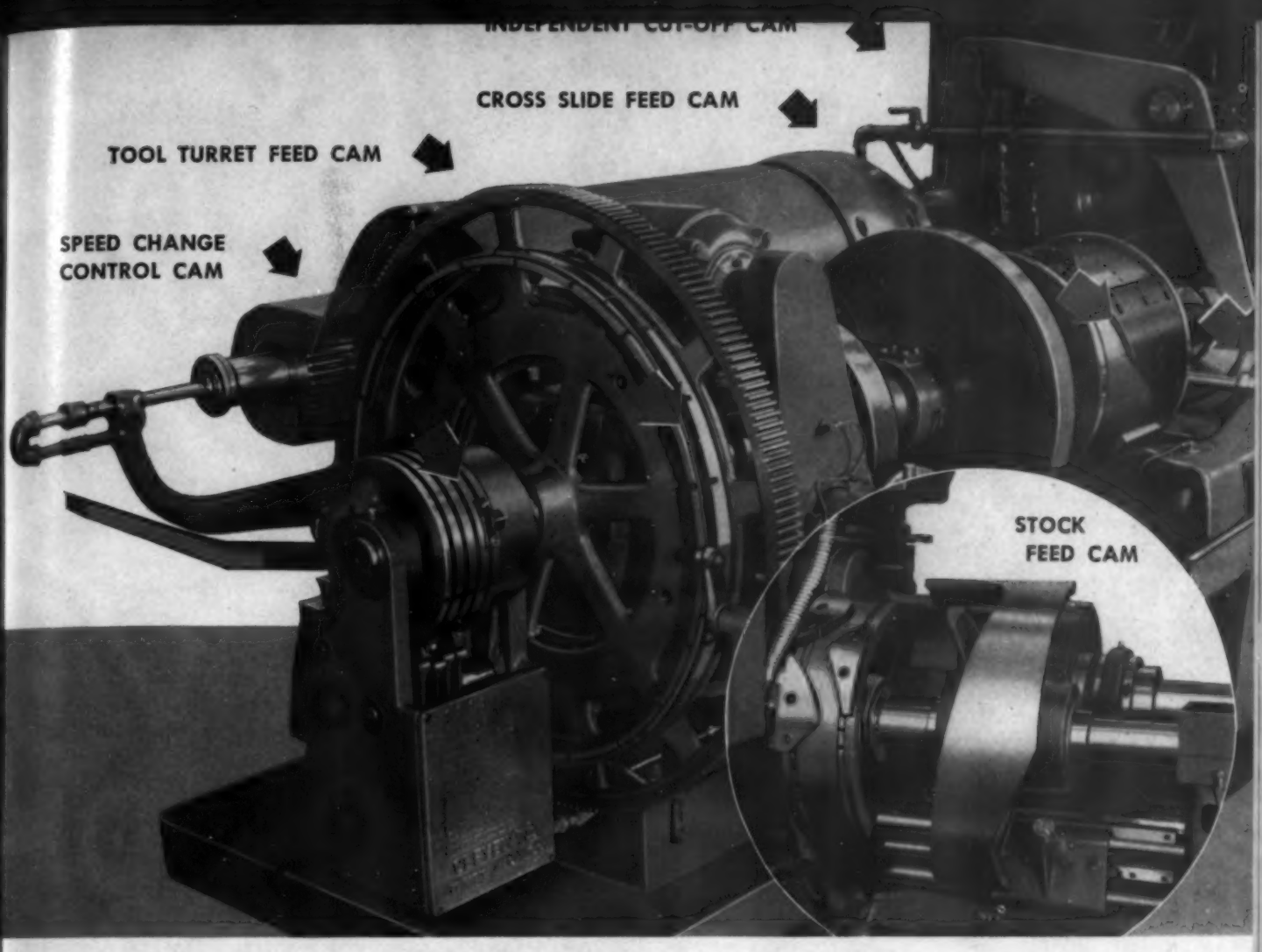
Measures Crane Travel

Cranes are used to move the steel from the time it enters the plant in the shape of ore. The travel of these cranes is measured by counters; travel of the rope used by the lift also is measured. It enables a check to be made on the life of the rope, so that replacements can be made before a break occurs. The record of the travel of the crane is measured as to its efficiency, as against other cranes of similar size. In some cases incentives are added to wage pay scales, based on records obtained from these counters. Industrial trucks are used on the floor for a multitude of purposes and are checked as to their travel by counters installed in the hub of a wheel, showing the distance traveled.

Electric current for the large motors

(*Please turn to Page* 134)

Reeling machine equipped with dials, the one to the left indicating the number of feet of strip in the coil



CLEVELAND UNIVERSAL CAMMING HELPS IN SOLVING YOUR MAN-POWER PROBLEM

MODERN production, be it on munitions or "civilian goods", constantly faces the need to make time savings on each operation on every machined part, to give each man *the power to produce more,* both for the assembly line and for himself. Clevelands help to solve such problems, not merely because they are fully automatic, but also because of exclusive Cleveland production speeding features. A good example is universal camming, which greatly reduces the time required for set-ups and adjustments.

Every operation on a Cleveland Single Spindle Automatic is controlled by standard cams. Quick settings are made possible by this Cleveland feature, and when a set-up is made, the Cleveland speed of production on multiple operations is such that savings commence within a very few pieces after the run starts. That's another reason why Clevelands have a wide reputation for . . .

1. Maximum sustained production on long runs, with minimum down time for adjustments.
2. Profitable economy on small lot, short run jobs.

Just Remember, Clevelands Cut Costs

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CHICAGO: 20 North Wacker Drive, Civic Opera Building, Room 1408
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CLEVELAND
Single Spindle
AUTOMATICS

MODEL A—Built in 1⅛-inch to 3½-inch capacities
MODEL B—Built in 1⅛-inch to 2½-inch capacities

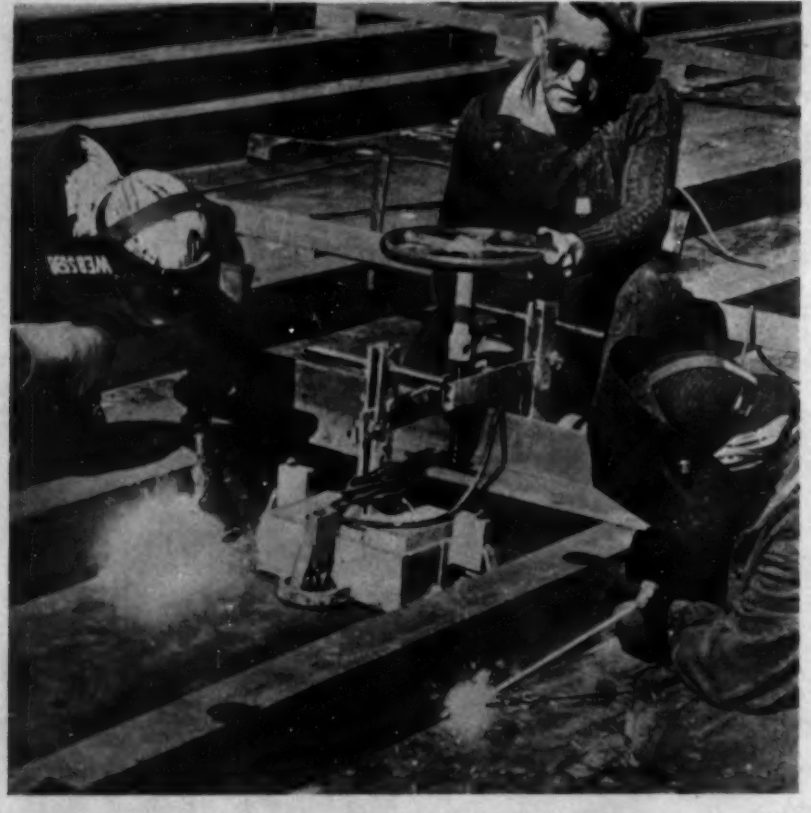
Institute Issues Two More Revised Steel Manuals

Steel product manuals on carbon steel semifinished products and cold-finished steel bars and shafting, sections 2 and 9, respectively, revised as of June of this year were recently issued by American Iron and Steel Institute, 350 Fifth avenue, New York.

The publication on carbon steel semifinished products embodies definitions, quality classifications and manufacturing practices. It also describes standard steels and system of identification, chemical limits and ranges for nonstandard steels and standard methods of sampling for check analysis.

The other manual on cold-finished steel bars and shafting discusses methods of manufacture, definitions and manufacturing practices, shafting, special shapes, standard tolerances, standard carbon and alloy steels, ranges and limits for nonstandard steels, methods of sampling and permissible variations for check analyses. A chapter also is devoted to packaging and loading.

"THE BIGGER THEY ARE THE ————": Size was no factor when a Montreal structural steel plant adapted an Airco Planograph flame-cutting machine, whose normal cutting range is 24 x 72 inches, to the task of "whittling" down and shaping a 7-ton steel slab into a mammoth crosshead measuring 42 x 65 inches. Cut in "installments," the slab was preheated to 400 degrees Fahr., and cutting proceeded with a water-cooled torch. Cuts were of a depth of 20 inches at a speed of 3 inches per minute, the piece being repositioned several times to present the various faces into the motion range of the torch. Total setting up and cutting time was 3 hours



TIME SAVER: Two stiffeners are firmly held to deck plate for tack welding in this shipyard operation by a Sweetland type B magnetic clamp which enables a flanger to keep two welders busy without the aid of saddles or other devices requiring temporary welds. The device, made by Glenn-Roberts Co., Oakland, Calif., is equipped with retractable ball-bearing wheels working on a ball bearing swivel to facilitate movement. It operates on alternating current with a 12-ampere rectifier, on 80-volt direct current or on power supplied by a motor-generator welding set

Huge Generator Capable of Lighting a Million Bulbs

Sixty-five million watts of electricity is being produced for the Bureau of Power and Light at Los Angeles Harbor, by a huge turbo-generator said to be one of the largest of its type ever built

The shaft of the turbine turns at 3600 revolutions per minute, and is rotated by jets of steam bombarding the blades thousands of times a minute.

The turbo-generator, built by Westinghouse Electric & Mfg. Co. cost more than $1,000,000.

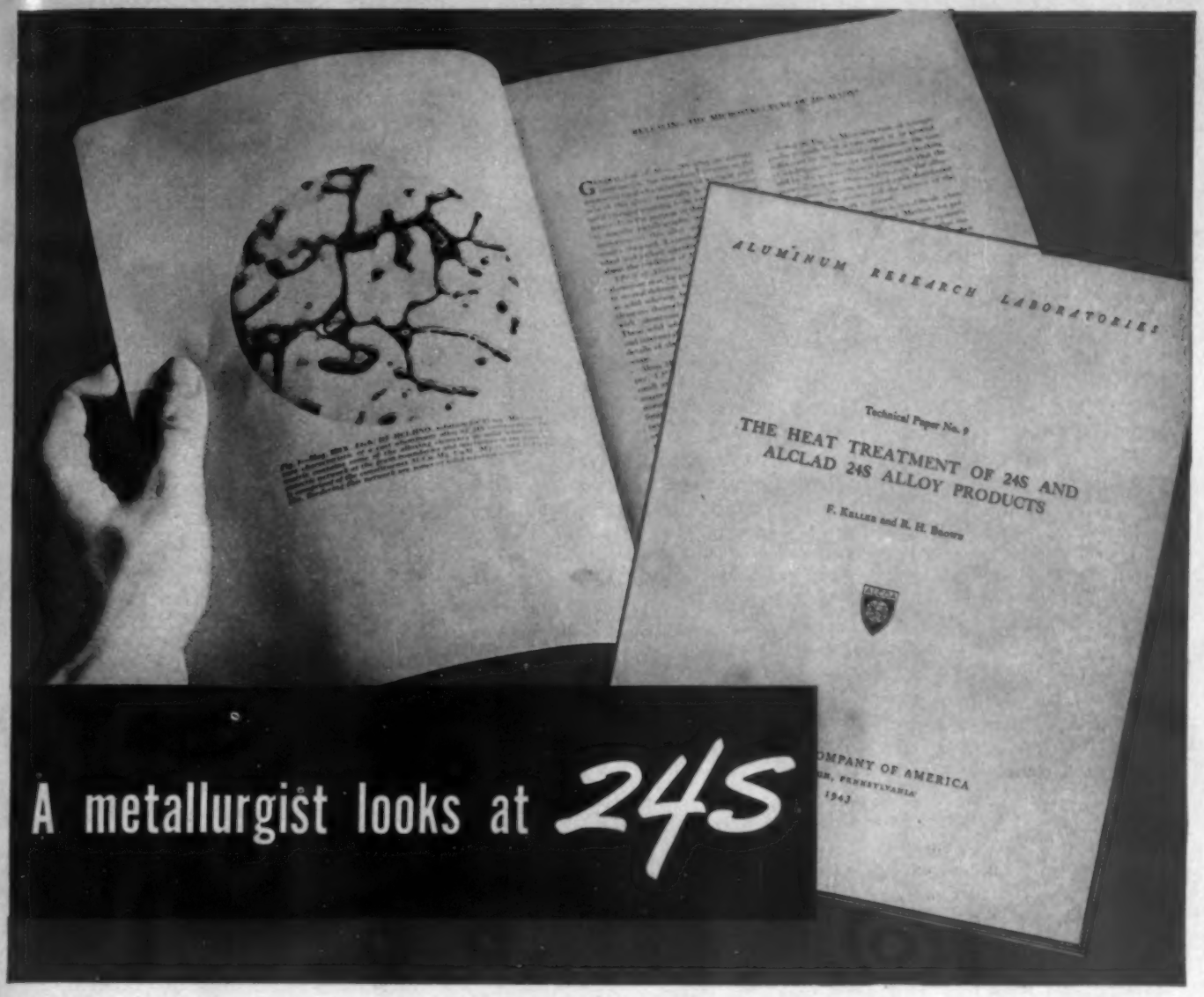
Electrically, it produces enough watts to light more than 1,000,000 standard 75-watt incandescent Mazda lamps simultaneously.

The steam used to rotate the blades is heated to 900 degrees Fahr. and exerts a pressure of 850 pounds per square inch on the blades.

Various devices record operating efficiency of the new machine and warn against possible failures. Electro-magnetic devices guard against trouble in the rotating part of the huge machine—a 43-ton piece about 65 feet long.

Because of the high heat developed from rotational losses, cooling is vital.

Hydrogen gas, which acts much like a sponge, is passed at the rate of 400,000 pounds per hour through the coolers built around the generator. The cooler has a capacity of 63,000 cubic feet per minute.


ALUMINUM RESEARCH LABORATORIES
Technical Paper No. 9
THE HEAT TREATMENT OF 24S AND ALCLAD 24S ALLOY PRODUCTS
F. Keller and R. H. Brown
A metallurgist looks at 24S

Aluminum alloy 24S is used in aircraft construction for parts subjected to high stress; 24S and Alclad 24S sheet and strip for airplane skin and structural members, 24S wire for rivets. Parts made of this alloy are hardened and strengthened by heat treatment.

Technical Papers No. 8 and No. 9, pictured above, tell how you can check the effectiveness of heat treatment. Metallographic methods of examination and the results obtained are outlined. You can detect variations from standard practices by comparing samples taken from your production with those pictured in these papers.

Practices described have been used at Aluminum Research Laboratories and in the industry for many years. When these methods are followed closely, and the proper skill attained, it is possible to determine many pertinent facts about 24S from metallographic examinations. Your metallurgist should have these two booklets.

For copies of Technical Papers No. 8 and No. 9, write ALUMINUM COMPANY OF AMERICA, 2112 Gulf Bldg., Pittsburgh, Pa.

ALCOA ALUMINUM

How To Prevent . . . .

WEIGHT-LIFTING INJURIES

WITH OUR need for unflagging production, with the growing shortage of workers, what employer would knowingly take a chance on any one of his employes being laid up from 7 to 19 weeks —of being permanently disabled or even killed? With his services more essential to his country than ever before, what worker would deliberately expose himself to such a risk?

Yet the record indicates that year after year many thousands of workers and their employers took just such a chance—and lost! Unsafe lifting methods and practices lead to injury and most lifting injuries are strains, sprains, and hernias. Statistics from three leading industrial states indicate that strains, sprains, and hernias constitute about one-quarter of all industrial accidents; that about one-half of these may be attributed to lifting and carrying weights.

The causes of weight-lifting injuries are known. The methods of eliminating the hazards are definite and practical. They are set forth here as a guide to management and supervisors, to be used for the purpose of cutting down the lost production, wasted manpower, the human suffering, which result from disabling injuries. And that is only one side of the story. *Safe* methods of lifting and carrying are more *efficient—they boost production by speeding the handling of the materials involved.*

Most lifting injuries are the result of undue strain on certain muscles and tendons brought into play by the task. Such strain can be caused by any one of the following factors:

—Lack of lifting and conveying equipment.

— Overtaxing physically fit workers — through the worker's failure to use or the supervisor's failure to require the use of available mechanical equipment, or through management's failure to set a reasonable limit on the weight of objects to be lifted or carried, and to control the pace and duration of the work.

—Lifting the wrong way, which results in undue strain on certain muscles and ligaments—notably in the back and groin.

—Lifting by employes not physically capable of handling the job.

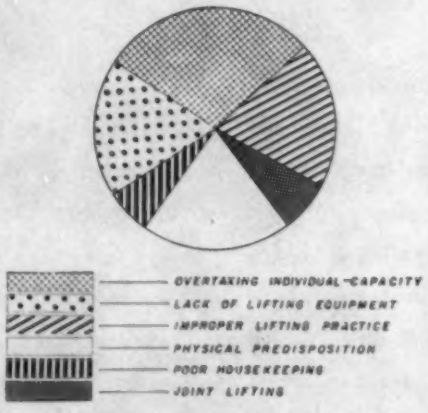
—In team lifting—lifting by two or more workers—the uncoordinated efforts of the team members, resulting in too heavy a burden upon one or more.

—Poor housekeeping, resulting in insecure footing and tripping and slipping hazards.

Relative importance of these causes will vary from plant to plant. For example, the highly mechanized plant may find that no injuries are due to lack of lifting and conveying equipment, although poor supervision may result in injuries from failure to utilize existing equipment. Fig. 1 represents the composite result of correlated studies in lifting injuries in a number of plants requiring heavy work. It is reproduced to serve as a guide to management in attacking the problem of weight-lifting injury.

Immediately below — Causes of weight-lifting injuries — strains, sprains, hernia and the like

Bottom—In computing energy required for lifting, multiply distance in feet by weight in pounds to obtain foot-pounds of energy expended. When weight is lifted from floor to bench, add 40 per cent of body weight. When lifted above shoulder level, add 25



Eliminating Lifting Hazards

Four Factors for Control

The elimination of hazards in lifting and conveying demands careful attention to four primary factors: (1) Over-all planning of process and work methods; (2) selection of physically qualified employes for manual lifting and carrying jobs; (3) careful training of employes in correct methods of manual lifting and uses of mechanical equipment; and (4) continuing supervision to make sure that manual lifting instructions are followed, and that equipment is properly used.

Overall planning of process and work methods is a management job. It includes:

—Analysis of all lifting and conveying problems to determine the type and amount of work to be performed in the workday.

—The installation of mechanical lifting and conveying equipment wherever practicable.

—Controlling the amount and pace of the work to be done by individual employes.

Management must lay down the general rules; supervisors must adhere to them. Realistic treatment of this problem calls for:

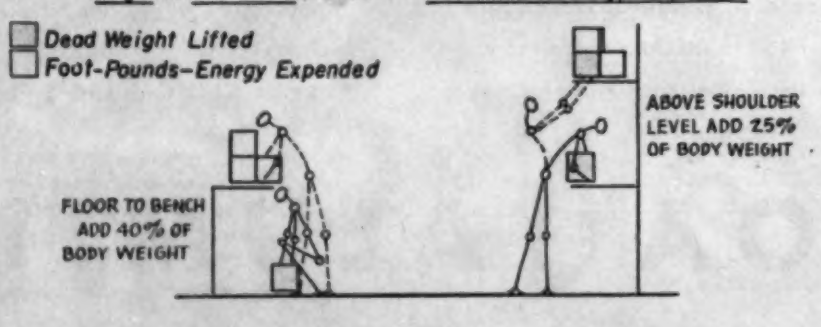
—Classification of all employes as to their suitability for manual lifting.

—Careful selection of those workers assigned to jobs requiring heavy or repetitive lifting.

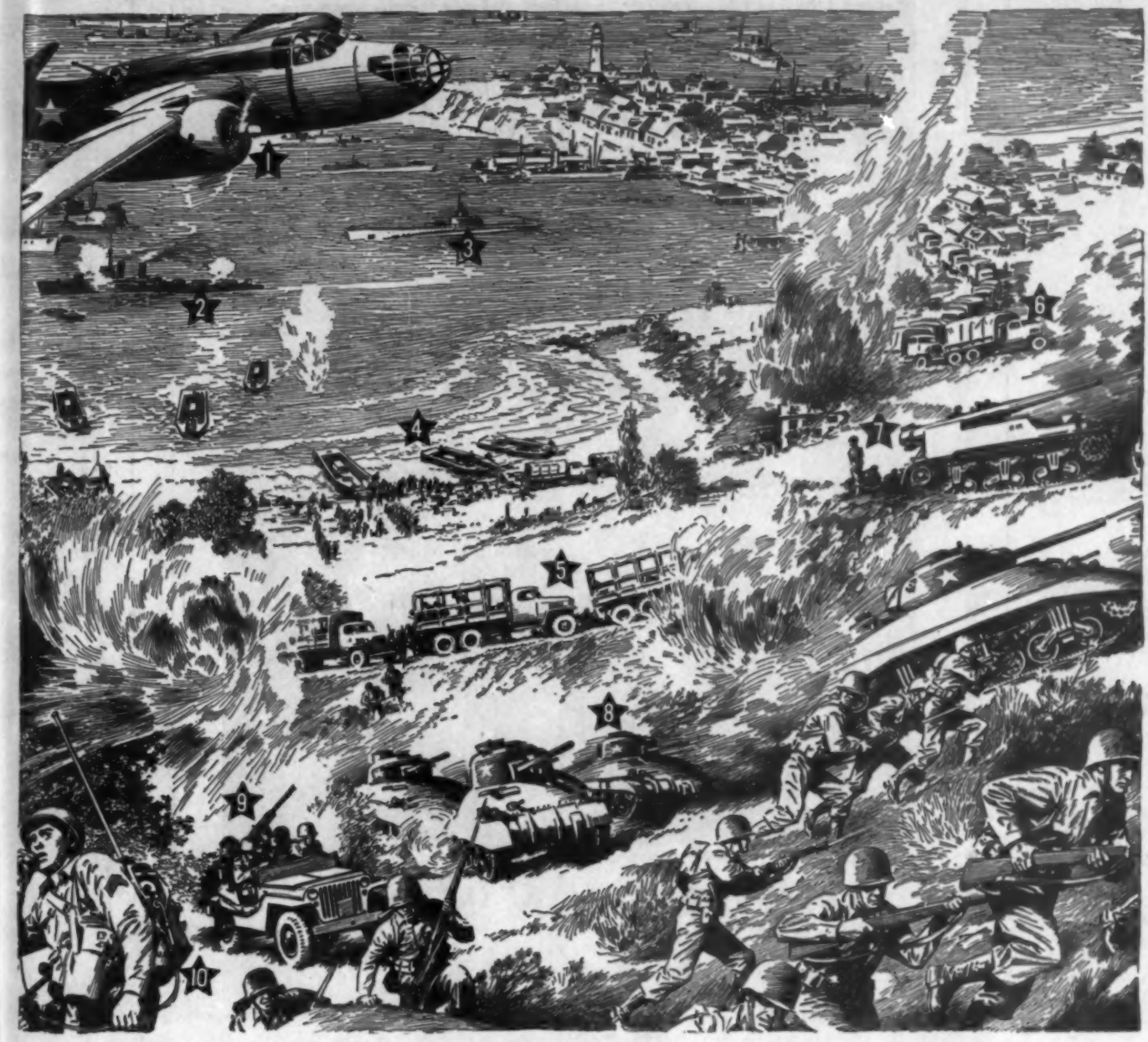
—Selection of workers of like stature and physique for "team" lifting.

No employe should be permitted to lift or carry weights until trained in correct methods and practices. In "solo" lifting the employe should:

—Face the object with feet far


Weight X Distance (in feet) = Foot-Pound-Energy Expended
Dead Weight Lifted
Foot-Pounds-Energy Expended
FLOOR TO BENCH ADD 40% OF BODY WEIGHT
ABOVE SHOULDER LEVEL ADD 25% OF BODY WEIGHT

Without batteries...war machines are useless!



1. Bomber 2. Destroyer 3. Submarine 4. Landing Barges 5. Troop Transport Trucks 6. Supply Trucks 7. Self-propelled 155 mm. Gun 8. Tanks 9. Jeep 10. "Walkie-talkie" Communications

Modern mechanized warfare demands a dependable source of electric power, which, under most conditions, only a storage battery can supply. Our mightiest weapons would lie useless, idle, dead, without such a source of power.

On every fighting front, on land, at sea, and in the air, Exide Batteries are filling this important role. Exide Batteries are used in over 100 applications by our armed forces. Significant of our part in the war effort are the Army-Navy "E" pennants, with two stars, that fly over our plants in Philadelphia.

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The lads who fly our bombers are teamed temperamentally for friction-free and split-second co-ordination to beat the enemy to the punch. They are the height of "all for one, one for all."

Likewise, in their "Suzy Q's" and "Fat Emma's," tons of intricate machinery and instruments turning on thousands of ball bearings function freely, smoothly and accurately—all to one paramount purpose—defeat to the Axis.

And teamed with men and mechanism, New Departure Ball Bearings are carrying the brunt of this job—reducing friction, keeping things cool, postponing wear and maintaining precise location of parts. In fact, New Departure has a major responsibility in the whole ball bearing war production program.

NOTHING ROLLS LIKE A BALL

NEW DEPARTURE
ball bearings—as near perfection as engineering sciences can make them—help to keep 'em...flying... rolling...firing...winning

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BALL BEARINGS

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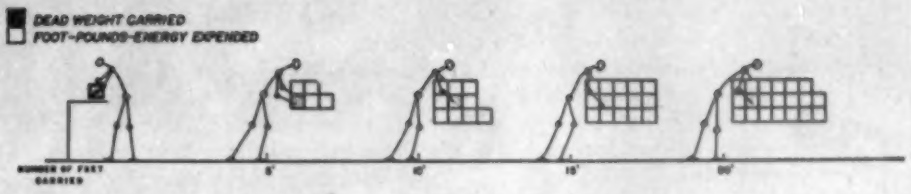
NEW DEPARTURE • DIVISION OF GENERAL MOTORS • BRISTOL, CONNECTICUT

Energy expended in carrying can be computed by multiplying distance by weight carried, no addition being necessary for body weight as in lifting



enough apart (the length of the shoe is a good guide) to give a good base of operation without placing undue strain on the abdominal muscles. Adopt a stance which is comfortable and which will permit one to lift the job as nearly straight up as possible.

—Get down to the job by bending his knees, keeping his back erect.

—Raise the weight gradually (a sudden effort invites strain) by straightening his legs, taking the brunt of the strain upon his leg and shoulder muscles.

Heavy work should be done with mechanical equipment where available; otherwise with the assistance of fellow workers assigned by the supervisors.

In "team" lifting, the efforts of the various workers must be completely coordinated, with directions being given by one, and only one, member of the "team".

Continuous and careful supervision is fundamental in accident-free lifting and conveying. Available mechanical devices should always be used for heavy or repetitive work. Manual lifting should be done only by those who are qualified by physique and training. Workers should always lift in accordance with instructions. Unless the supervisor makes sure that the work is done with the proper equipment, by the right workers, in the correct manner, the overhead planning and the selection and training of workers may be of little value.

Good Houskeeping An Aid

Good plant housekeeping is as essential in safe lifting and carrying operations as it is in all phases of accident prevention. A firm which takes all of the steps outlined above but fails to keep a clean and orderly workplace will have workers injured while lifting and carrying. Aisles should be well marked and clear of obstructions. Floors and stairways should be kept in good repair and free from oil, grease, water, and debris. The entire plant, including stairways and ramps, should be well lighted.

Mechanical equipment helps to reduce injuries due to strain by eliminating manual lifting and carrying. Such equipment also results in more efficient production, performing heavy or repetitive jobs much more rapidly than is possible solely with manual labor.

Mechanical equipment need not always be complicated or costly. Often the solution of the lifting or conveying problem is as simple as a rope hoist, a wooden chute, a hand truck, or a home-made gravity conveyor. Where conditions justify the expenditure, it is well to provide such equipment as electrically powered trucks which load, convey, and stack, or powered horizontal or vertical conveyor systems. These latter lead to more efficient production, but the simpler "gadgets" are often very effective in eliminating manual handling.

Three Major Considerations

There are three considerations to be taken into account in the control of manual lifting and carrying. They are (1) the distance over which it must be raised or carried; (2) the weight, size, and shape of the object to be lifted or carried; and (3) the pace and duration of the heavy work during the course of the day. At first thought the weight of the object seems the primary and, perhaps, the important consideration. But remember—the tired worker, the worker who carries even moderate loads over long distances continually throughout the day, is not only less productive, but also is more likely to strain, sprain, trip, and lose balance.

Distance is particularly important where lifting or carrying is an integral part of the job and must, therefore, be repeated frequently in the course of a workday. It is important that daily work limits in such cases be established upon the basis of the energy expended. The energy expended on any one job is measured in terms of "foot pounds," and is calculated by multiplying the weight of the object by the number of feet over which it is raised or carried. The daily expenditure of energy by any worker is the total "foot pounds" of energy expended on all of the jobs performed by him during the day. Figs. 2 and 3 show the proportionate increase in terms of foot pounds energy required in lifting and carrying weights over given distances.

Load carrying up or down stairways or inclined ramps calls for more exertion than carrying on level surfaces. Stairs increase the danger of stumbling; the ramp is generally safer. However, stairs and ramps call for approximately the same expenditure of energy, so that the hazards of strain and fatigue induced solely by the weight of the load are about the same in either case.

The actual number of pounds which may be lifted by a worker depends eventually upon the worker himself. The physical qualifications of the individual worker, the training and experience in lifting—these are the actual criteria of how much he or she can safely lift. But, since war production demands the handling of thousands of employes, constant attention to each weight-lifting job and the individual involved is not practical. It is well to have some rule of thumb to serve as a general guide. The following limits are recommended for consideration in setting over-all limits for employes in general:

Male workers—50 pounds in compact form;

Female workers—25 pounds in compact form.

Give Workers "Break" Periods

Certain employes whose physical characteristics make it unsafe for them to handle the above weights should not be permitted to do such work. Other employes who are qualified by general physique, training, and experience to do heavier work should be assigned to such jobs on an individual basis.

It is essential that workers engaged in continuous lifting and carrying of weights be given "break" periods—periods free from strenuous physical exertion. This is important, not only because of the fatigue factor, but because continuous strain upon the muscles and tendons incurred in constant and rapid carrying of even moderate loads can build up to a similar type of injury incurred in the sudden effort of lifting. Where the work is heavy and continuous and the pace rapid, it is recommended that employes spend no more than half the day on such work, and at least half the day on some lighter work.

The shortage of available industrial manpower is calling into industry many persons who are unused to or physically unfit for heavy work, or who are "rusty" at such jobs as the handling of heavy objects. These war workers have an essential part to play on the industrial front; they must not be needlessly exposed to injury.

For general control purposes it is advisable to classify all workers as to their suitability for manual lifting as

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From "A Guide to the Prevention of Weight-Lifting Injuries", published by United States Department of Labor, Division of Labor Standards.

there are many physical conditions which predispose a worker to the type of injury most likely to result from heavy strain. Persons having such conditions should not be required to do heavy lifting—perhaps no lifting of any consequence.

Best known of such predispositions is the tendency of hernia. The hernia problem was summed up as follows in "The Causes of Everyday Factory Accidents" a recent publication of the British Ministry of Labour and National Service: "Hernia, however, is not caused solely by lifting. It has two causes: First, a natural tendency to it must exist. Secondly, a strain which finds out that tendency."

Certain structural defects, such as short legs, overweight, underweight (particularly in tall persons), and deformities of the spine make some workers much more likely to experience strain from lifting. Again, workers who have arthritis or who have sustained previous injury to their joints are likely to experience "flare-ups" of the disease or of old injury if called upon to do heavy lifting.

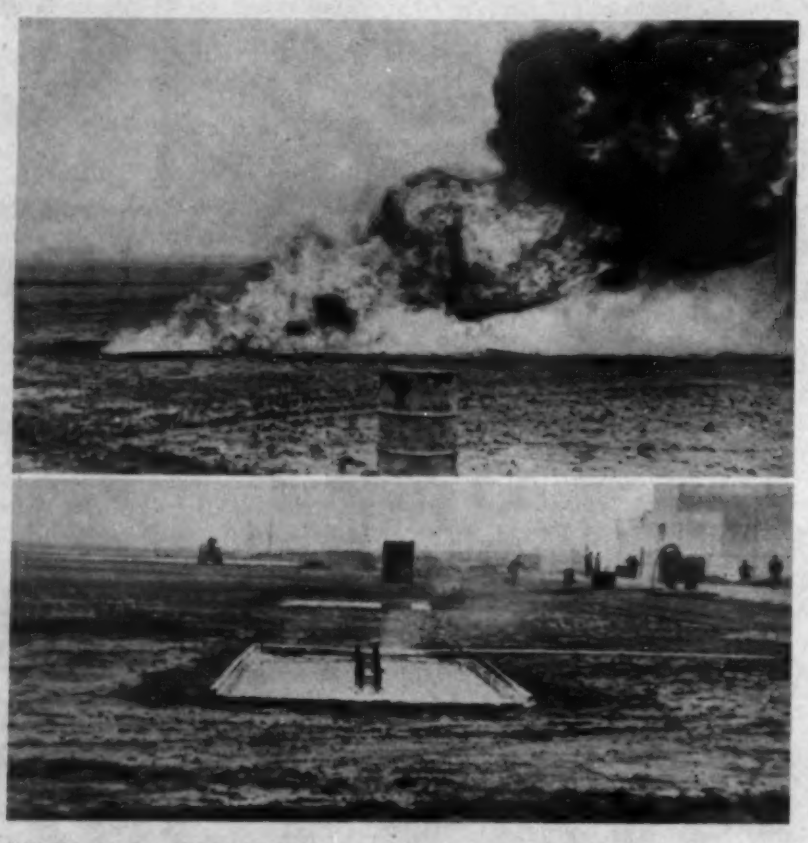
The over-all strain of lifting is dangerous to persons with weak hearts or high blood pressure, and to those who have suffered from lung disease.

Pregnancy results in marked variations in such factors as breathing, pulse rate and the composition of the blood, as well as a lessening of muscular power. Furthermore, the physical condition of the pregnant woman changes from month to month. All of these factors must be taken into account in assigning work to pregnant women.

Many of the defects or conditions listed above will come to light, or their exact effect upon the abilities of the worker will be discovered, only through a thorough physical examination.

Heavy or repetitive work should be done only by employes especially selected upon the basis of physical qualifications, training, and experience.

"Team" lifting can be a fertile source of injuries if certain fundamental considerations are overlooked. All workers in a "team" should be of the same general stature and physique. They must know the fundamental of "solo" lifting. In addition it is important that they are trained or experienced in working with others on lifting jobs. The efforts of the group should be under the direction of one, and only one, of its members, who will give all orders. These factors must be taken into account to assure the co-ordination necessary to prevent accidents.



"OUT" IN 31 SECONDS: Views above present the "before and after" story of a recent demonstration of the use of carbon-dioxide snow produced from low-temperature, low-pressure liquid carbon dioxide developed by Cardox Corp., Chicago, for fighting quenching-tank fires. The metal sided 10 x 20-foot tank was fired and allowed to burn for over a minute—long enough to heat the side walls as well as a few metal parts placed in the oil. Thirty-one seconds after the linear nozzles on two sides of the tank went into action the fire was out. Reignition is prevented by cooling characteristics of the CO_2 snow

Further Precautions Necessary

Training and supervision are essential to the safe and efficient performance of all industrial jobs. They are particularly necessary in the case of lifting because easily injured portions of the body—the back and the abdominal muscles—will bear the brunt of the physical strain if lifting is done incorrectly. Before a worker attempts to lift manually he should make sure that both his hands and the object to be lifted are free of oil or grease, so that he may obtain a firm grip; the floor is free of debris, oil, or water, in order that he may be sure of firm footing; and the weight is not too heavy for his unassisted efforts. The last two factors are primarily the responsibility of good management and supervision, which will maintain good housekeeping and guard against assigning a worker too-heavy work. Some firms have found the stamping of the weight on small but heavy objects helpful. However, the worker should check both the condition of the floor and the weight of the object for his own protection.

The primary differences between a safe and an unsafe lift are described here. The worker in correct position has his knees bent, his back erect. The worker bending from the waist takes the brunt of the burden upon his back, inviting injury.

Heavy Loads Entail Same Hazards

Carrying heavy loads, or sustained carrying of even moderate loads, exposes the worker to the same injury hazards as the sudden effort of weight lifting. Where practicable, the need for manual carrying should be eliminated by the use of mechanical devices—trucks, conveyors, chutes, elevators etc. Safe manual carrying, as outlined by this authority, requires:

—That the load be close to the body and as near the worker's center of balance as possible to prevent too-heavy strain in one portion of the body, and throwing the worker off balance.

—That the worker have unblocked vision ahead.

—That the load interfere as little as

(*Please turn to Page* 135)

This part produced in ONE forming cut by the

OSTER NO. 601

"RAPIDUCTION" TURRET LATHE

The part illustrated is one of numerous examples of heavy forming cuts obtained with the SIMPLIFIED Oster No. 601 "RAPIDUCTION" Turret Lathe, equipped with WORM DRIVE.

The hardened and ground steel worm, like the spindle, is mounted in ball bearings. A smooth, even flow of power is transmitted through a bronze worm wheel to the spindle. This smooth flow of power makes possible exceptionally heavy forming cuts with absence of chatter. (For high speed work on small diameters and non-ferrous materials, a DIRECT DRIVE is provided. Spindle speeds up to 3000 R. P. M. are obtained.)

The 6-station turret is now equipped with AUTOMATIC INDEXING. Price of complete machine is unchanged (Under $2000 without tools, F. O. B. Factory). The form below offers a convenient way to obtain full details QUICKLY. *Use it!*

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★ O.K. Oster. We're interested in the No. 601 machine. ( ) Send Catalog No. 601. ( ) Ask your nearest distributor to see us at once. (Check either or both of above requests.)

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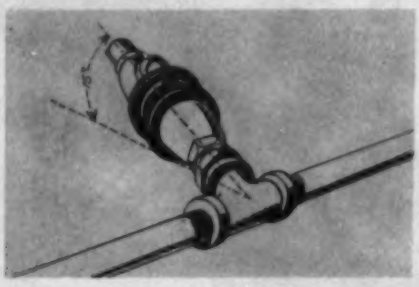
INDUSTRIAL EQUIPMENT

Automatic Lubricator

Filters Inc., 1515 Gardena avenue, Glendale, Calif., announces an automatic light-weight Air-Lube lubricator for feeding a regulated oil mist into air



tools. It is offered for use in the air hose from 1 to 6 feet from the tool, or it may be used in air pipes for larger air-driven stationary or semi-portable tools. It also is adaptable for air passages in a machine.

A positive feeding action in the unit provides a regulated amount of oil, but feeds oil only when the tool is operating.

The oil reservoir holds enough oil for more than a week under normal usage.

Installation of the lubricator in the hose near the tool eliminates the deterioration of rubber hose lines. Positive regulated wicking action with an automatic shut-off prevents flooding.

Dressing Tool

Wheel Trueing Tool Co., Detroit, announces a dressing tool reported to provide production increases up to 500 per cent and reductions in production cost of as much as 75 per cent.

The tool uses the hard characteris-

tics of the natural uncut diamond, yet it is of a shape that permits not only straight dressing but angle, radial and multiple form dressing as well.

Because the tool produces exceptionally clean cuts, forms are obtained quickly and held longer, it is said. As these cleaner cuts permit more work to be ground between dressings, machine down time is reduced greatly. Another advantage, according to factory officials, is the tool can be made and reserviced on a production basis. It may be used for dressing the wheels that grind Whitworth, buttress, Acme or any other standard or special thread.

Welding Shield

Davis Emergency Equipment Corp., 55 Halleck street, Newark, N. J., announces new model Huntsman acetylene and arc welding shields designed for comfort and complete protection.

Each shield features a patented locking device and an adjustable headgear. The locking device holds the shield in the correct position before the face to in-

sure the line of vision passes through the lens at right angles to the surface of the glass. It also holds the shield firmly above the head while the welder is preparing, chipping or surveying his work.

When welding is resumed, a slight nod of the head will lower the shield into the correct working position. The locking device automatically adjusts the shield to the same position each time.

The shields weigh from 1 to 1½ pounds and are being offered in six models.

Dust Collector

Aget-Detroit Mfg. Co., 2040 Book building, Detroit, announces a combination of Dustkop dust collector with metal hose and dust concentrating hoods in a single unit which can be used for flexible shaft grinding, sanding, die finishing, buffing and polishing operations. The outfit is entirely self-contained and needs no sheet metal work or connection with any existing dust collecting system. Portable and compact, the Dustkop machine is shipped ready for operation, with a flange to fit the 6-foot length of 4-inch diameter flexible metal hose. Increased lengths of hose are also used when the hood is to be suspended over the work. Handles on the hood permit ready moving about and allow it to be used as a guard against heavy pieces of work thrown off from the grinding operations.

Suction for the unit is provided by a 1½-horsepower continuous-duty motor driving a multiple-blade fan which gives

6500 feet per minute air velocity at a volume of 1250 cubic feet per minute when a 4-inch hose is used. The dust-laden air is drawn away from the work through the flexible metal hose and into the cyclone separator. The cleaned air is then returned to the working space through a drum-shaped, spun glass filter, which forms the upper portion of the machine. Dust and dirt are deposited in a glass jar so located as to be easily seen.

First-Aid Station

Medical Equipment Division, J. E. Erback Co., 1170 Broadway, New York, recently introduced a mobile first-aid station called the Promt-Aid cabinet especially designed for quick use in emergencies. It is built to accommodate essential medical accessories. Large ball-bearing casters, allow it to be easily moved right to the injured person.

One of the unit's features is it requires little floor space when not in use,

yet opens up to provide large working area.

Among the accessories included with this senior model are four, 4 x 4-inch glass dressing jars, five 4-ounce solution bottles, four 2-ounce solution bottles, one container for 12-inch adhesive plaster, or other size tape, two cover locks, one

(All claims are those of the manufacturer of the equipment being described.)

FREE TO WAR INDUSTRIES

To Help Increase Wartime Production, Cities Service Offers All Essential Industries A Free Industrial Heat Prover Test!

This test helps to solve combustion problems, reveals how fuel can be conserved, and the quantity and quality of the product increased.

Today, a vast majority of our industrial plants still are without any means of maintaining *accurate* combustion control.

It is to these plants that Cities Service Oil Companies now offer, *without charge or obligation*, a complete combustion control test with the unique, new Cities Service Industrial Heat Prover. This service is available on request in most of the important industrial cities East of the Rocky Mountains.

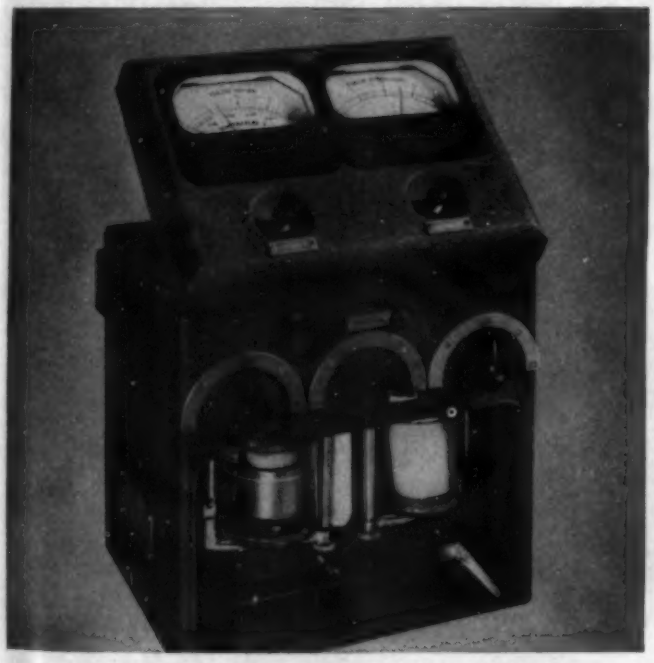
The Cities Service Industrial Heat Prover has been thoroughly tested on practically every type of combustion equipment in this country and with every kind of fuel.

It has been adopted by users of steam power plants, open hearth furnaces, cement kilns, heat-treating apparatus, crucible furnaces and internal combustion engines.

Accurate combustion analysis made as a result of the Cities Service Industrial Heat Prover tests have resulted in considerable savings in fuel costs, have reduced repairs and replacements on furnace linings, crucibles and refractories due to flame corrosion . . . and have led to increased production of better and more uniform products.

Wire or phone your nearest Cities Service office or mail the coupon today—for a Cities Service Industrial Heat Prover test in your plant.

A member of the Cities Service engineering staff will then visit your plant at your convenience and make a Heat Prover analysis of your combustion processes. This engineer has been carefully trained for the purpose, and has at his command extensive information gathered by the Cities Service Research Division from power, metallurgical and chemical fields.



THE CITIES SERVICE INDUSTRIAL HEAT PROVER—a new, accurate combustion analysis instrument—developed by the Cities Service Research Division to enable those engaged in the oxygen control of furnace atmospheres to achieve greater combustion efficiency at less cost.

CITIES SERVICE OIL COMPANY
Room 1682
Sixty Wall Tower, New York 5, N. Y.

Please arrange a Cities Service Industrial Heat Prover test for my plant. I understand there is no charge or obligation for this service.

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Company_____

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CITIES SERVICE OIL COMPANY
NEW YORK · CHICAGO

IN THE SOUTH
ARKANSAS FUEL OIL COMPANY
SHREVEPORT, LA.

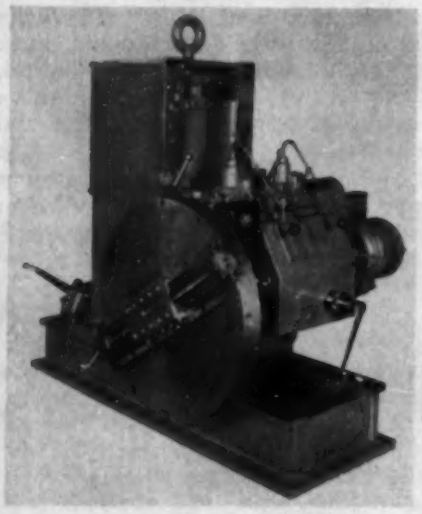
instrument drawer, three supply drawers and one 2-door, storage compartment.

Overall dimensions of the first aid unit with covers closed are 20 x 17 x 42 inches—working surface, with cover open 42 x 17 x 42 inches.

Boring-Facing Machine

General Engineering & Mfg. Co., 1523 South Tenth street, St. Louis 4, announces a new portable boring and facing machine for performing boring, turning, and facing operations on large work pieces, such as lathe beds and press frames, too large to be machined on standard machine tools. According to the company, application of the portable machine is simple and is accomplished with speed and accuracy.

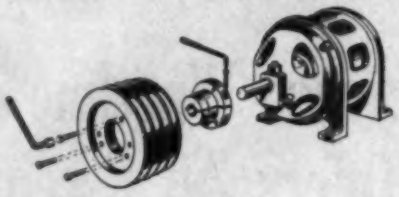
It is built of welded steel, is rigid and



simple in construction. The machine proper is mounted on a heavy base on which it may travel by spindle action for 36 inches. Automatic or crank-operated horizontal travel of spindle housing is 19 inches, and crank-operated vertical travel, 24 inches. Seven spindle speeds are featured. These range from 7 to 100 revolutions per minute. Also provided are four horizontal spindle housing feeds ranging from 0.009 to 0.0063-inch. Diameter of the face plate is 33 inches. The gravity oiling system is pump operated.

Sheave

Pyott Foundry & Machine Co., 328 North Sangamon street, Chicago, is offering a new QD Sheave, feature of which is the ease, speed and safety with which it is attached to or removed from the shaft. In installing the sheave a tapered, split hub is slipped on the shaft in line with the keyway. Then the headless cap screw shown is tightened down with an inserted key, clamping the hub firmly—producing a virtual press fit, even on undersized or oversized shafts. Next step is attachment of the sheave on the tapered hub. Actual tightening of the sheave on the hub is accomplished by



inserting pull-up bolts. These bolts protrude through the sheave and engage with threaded holes in the hub. Removal of the sheave is equally simple. After unscrewing the pull-up bolts, two pull-up bolts are inserted in special tapped holes in the sheave and tightened down. As they emerge through the opposite side of the sheave the pull-up screws act as jack screws to force the sheave away from the hub, without hammering or rough handling. The entire force is exerted on the Pyott hub.

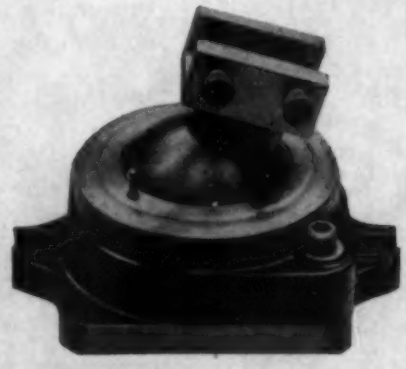
Fluorescent Light

Fostoria Pressed Steel Corp., Fostoria, O., recently introduced a flexible arm fluorescent unit, known as FLB, for localized lighting. It accommodates two 14-watt fluorescent lamps, and features a reflector 15 1/16 inches long, 9 inches wide and 5⅝ inches high.

The unit, according to the company, provides an output of 100 footcandles. It is equipped with lamp ballast and is completely wired with switch mounted on top of the housing.

Ball Joint Vise

Wall-Colmonoy Corp., 720 Fisher building, Detroit, announces a new Strickland universal ball joint vise which provides quick and accurate settings by



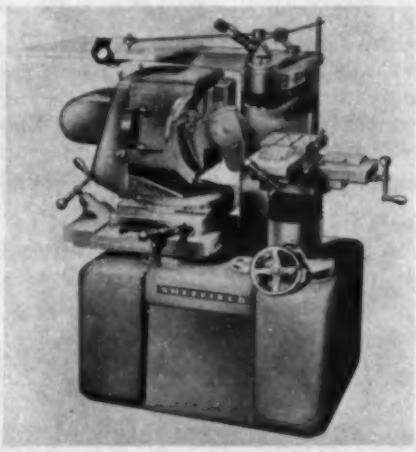
matching the ball joint vertical degree graduation with the horizontal degree graduation required. A clamp wrench locks the vise rigidly. The range consists of a 30 degree arc through the horizontal plane. The ball joint vise is 5¼ inches wide and 4¾ inches high. The ball and socket are protected by an adjustable leather dust apron. It is recommended for holding chip breakers, curlers and cutting tools while grinding at predetermined angles.

Profile Grinder

Sheffield Corp., Dayton, O., is offering a new Micro-Form grinder which by means of a 50:1 pantograph and a microscope finish grinds accurately every desired profile within its range directly from the drawing.

The machine is especially suited for the grinding of both circular and flat form tools, templets, profile gages, cams, dies, etc., from hardened materials including tungsten carbide.

A layout drawing made to a scale of 50:1 is placed on the drawing table of



the pantograph which has a microscope mounted on a short arm. Following the lines on the layout drawing from point to point with the pantograph stylus, moves the microscope equipped with crosshairs exactly according to the profile to be ground. The operator feeds the grinding wheel so that its cutting edge always works toward the point marked by the crosshairs which corresponds to the position of the stylus.

An accuracy of 0.0003-inch is easily obtained in the grinding operation, the company reports. Still closer limits can be held after the operator has become reasonably familiar with the machine.

The grinding wheel can be set at a desired angle to move in any direction by means of the unusual arrangement of cross and circular slides and other adjustments which give the effect of a double universal joint.

The layout size is 20 inches square, which makes possible grinding an area 0.400 x 0.400-inch in one setting. Profiles greater than 0.400-inch in area can be handled by other methods with the

When Someone Yells "FIRE!"

WHO MAKES THE NEXT MOVE?

What happens, if fire strikes in your plant?

Who grabs an extinguisher and hits the blaze hard, without panic, without fumbling? Who understands fire-fighting and the weapons with which fires are quickly snuffed out? *How many of your employees know how to handle an extinguisher?*

Fire extinguishers are easy to understand, and the basic facts about fire are simple. The best way to train your workers is by actual *demonstration*. Show them real fires, with extinguishers in action. Stage these demonstrations at your own plant, using your own equipment.

Walter Kidde & Company will send you "How To Teach Fire-Fighting." It tells how to handle demonstrations effectively, how to explain extinguishers and various types of fires. Write now for your own copy. We'll mail it promptly.

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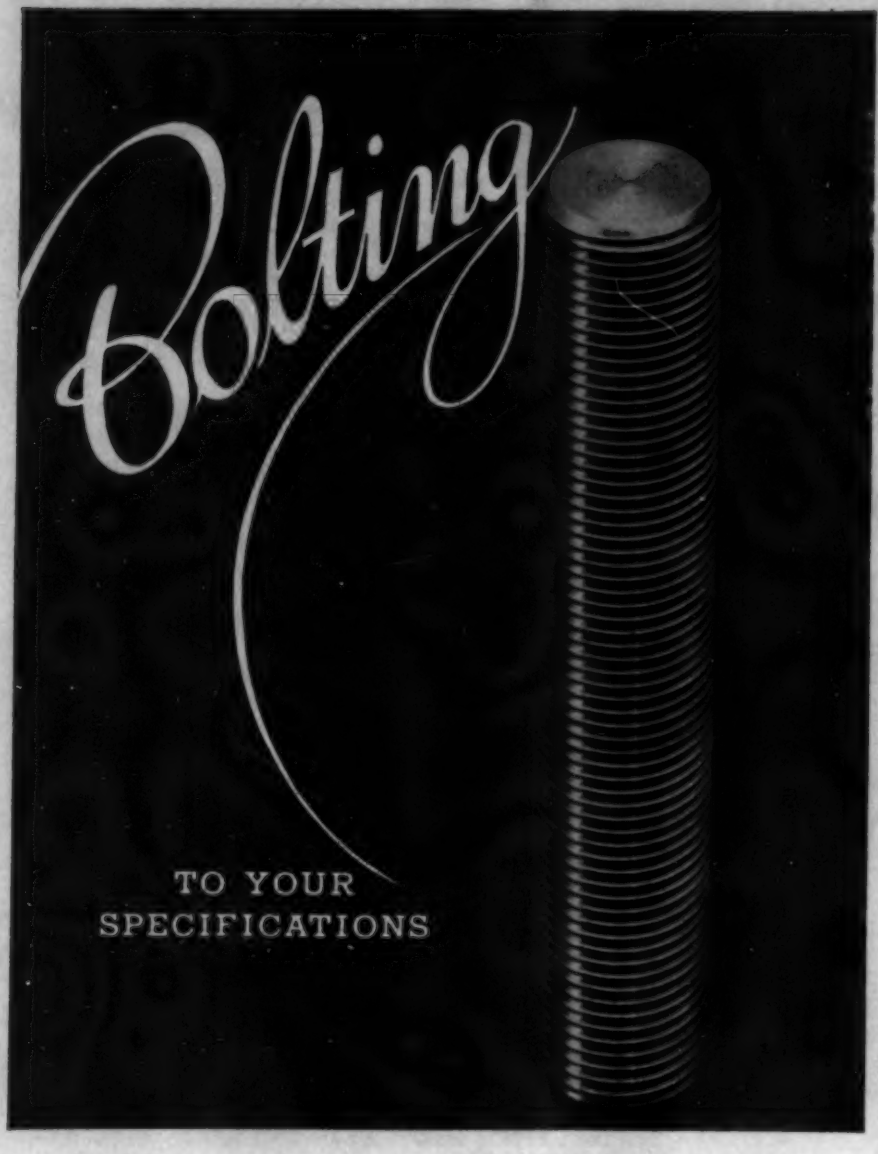


ALLOY STUDS

Erie Alloy Studs are manufactured in diameters from ½" thru 2½" in lengths to order, either continuous threaded or threaded each end. These are made to customer specification of material—heat treating and thread fit. Wherever pressure temperature or corrosion are determining factors in bolting we invite your request, for our experience is in this specialized type of bolting and any other out-of-the-ordinary type of bolt, stud or nut.

ERIE BOLT & NUT CO.
ERIE, PA., U. S. A.

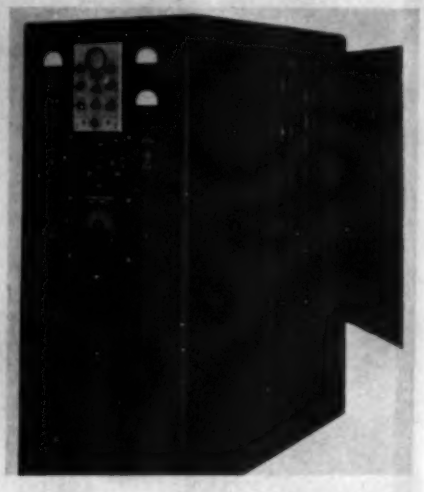
same equipment. Work may be accommodated up to 10 inches wide and 4 inches thick. Stock can be stacked to a height not to exeed 2 inches to produce several identical parts at one operation.

The machine also can be used in reverse for making 50:1 layout drawings from parts with unknown profiles and for checking parts against the layout drawings.

Electrical Source Unit

Harry W. Dietert Co., 9330 Roselawn avenue, Detroit, announces a new electrical source unit for spectrographic analysis. It not only combines the functions of the conventional direct current arc, alternating-current arc and high voltage condensed spark units, but it goes beyond in providing precisely controlled excitation suitable for all types of analysis.

With this unit the three factors of an electrical circuit, resistance, inductance, and capacitance, may be set and precisely controlled to selected values over wide ranges.



The unit consists of a main control panel mounted at the front, and a selector panel mounted at the side. The selector panel is equipped with pull knobs which allow selection of the conditions of discharge. Seven knobs at the front of the condensor section allow the selection of capacitance values from 1 to 60 microfarads in steps of 1 microfarad. Ten knobs allow the selection of resistance values from 1 to 400 ohms in steps of 1 ohm, while five knobs on the inductance section allow values from 25 to 400 microhenries to be utilized.

Switching is all done behind the panels by means of heavy insulated knife switches. The main panel is supplied with an oscillograph so that the current, duration and waveform of an average, individual discharge can be studied. Besides this indicator, an ammeter is fur-

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No holding up vital jobs while you wait for your grinding wheels or mounted wheels*.

Timing and scheduling are everything now. That's why our streamlined QUICK SERVICE is such an important asset.

Fully approved and endorsed by W P B, here's our war-time speed setup:

- Manufacture only wheels 3" in diameter and under. To speed production, larger sizes are eliminated for the duration.
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- Our central location brings us closer to many plants. No time lost in transfer connections or long distance shipping.

CHICAGO GRINDING WHEELS

The wheels of proved quality—known for performance, cutting and long life.

Any shape, grain and grade, any size up to 3" in diameter. From this army of wheels you can select one custom built for your job.

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*Half a century of specialization has established our reputation as the Small Wheel People of the Abrasive Industry You can bank on us.

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- ☐ Mounted Wheels
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You can still get two weeks' delivery on all Johnson Furnaces. Why wait longer for the units you need in a hurry? For more than 40 years Johnson Furnaces have served industry economically and well. Order your furnaces today!

NO. 130 HI-SPEED STEEL HEAT-TREATING FURNACE
Consistently develops 2300° F. in just 22 minutes. Use it for speedy, clean heating of all types of steel and for brazing carbide tool tips. Firebox 13" wide, 13½" long, 5½" high. Lined with hi-temperature insulating refractory. $248.00.

NO. 120 HI-SPEED STEEL HEAT-TREATING FURNACE
Reaches 1500° F. in 5 minutes. Excellent for heat-treating hi-speed steels. Compact, powerful and remarkably economical to operate. Widely used for hardening punches, dies and tools. Firebox 13½" long, 7¾" wide, 5" high. Insulating refractory lined. $129.50.

NO. 130A HEAT-TREATING FURNACE With 4 or 6 Burners
Use the 6-burner unit for heat-treating hi-speed steels, at temperatures from 1800 to 2400° F. The 4-burner unit offers 1400 to 2000° F. Counterbalanced door opens upward, so tools can be placed or removed without fully opening door — preventing temperature drops. Firebox 7" high, 13" wide, 16½" long. 4-burner — $295.00; 6-burner — $325.00.

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JOHNSON GAS APPLIANCE CO.
Cedar Rapids, Iowa

nished to check the power consumption of the unit and a voltmeter to check the consistence of the voltage across the condensors before discharge.

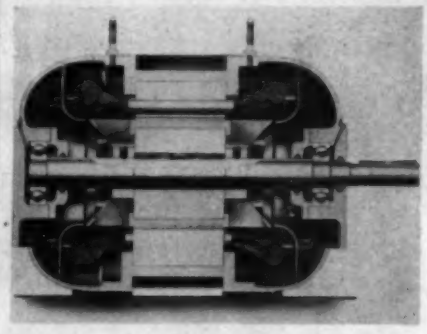
Another voltmeter indicates the difference between the input voltage and regulated voltage so that the instrument can be adjusted to account for extremes of line voltage variations, thus preventing any decrease in accuracy on this account. A phase control knob, coupled directly to the synchronous gap, provides the necessary adjustment of the ignition point of the discharge.

An adjustable, zero to 2-minute synchronous timer allows the total time of operation to be precisely controlled. All necessary switches for starting and adjusting the unit are also provided on this panel.

The unit is housed in a large spot welded metal case 63 x 28 x 50 inches. It is subdivided into a series of subassemblies, each of which can be inspected and serviced by pulling out a panel at the front or side. Casters allow the unit to be moved easily.

Induction Motor

Lima Electric Motor Co., Lima, O., is offering an RS drip-proof induction motor designed to give maximum protection against chips and filings, dripping or splashing liquids. It is adaptable to



machine tool and production equipment and other uses where a totally enclosed motor is not especially needed.

An alternating current unit, the motor is available in ½ to 75-horsepower sizes. It is equipped with heavy-duty ball bearings, dynamically balanced rotor and heavy rugged frame.

Tap Grinder

Edward Blake Co., 634 Commonwealth avenue, Newton Centre, Mass., is introducing a new No. 2 tap grinder for sharpening the chamfer on taps from 0 to 2 inches, and up to 14 inches long. The machine is similar in construction to the company's No. 1 tap grinder except that the bed casting is longer to accommodate longer taps. The segment under the wheel head slide is wide

Speed WAR PRODUCTION TRAINING

USE THESE BOOKS AND FILMS ON LATHE OPERATION

One of the most serious problems confronting management today is the training of new employees to replace thousands of skilled technicians who have been called for service with the armed forces. With inexperienced workers, production goals must be increased and standards of precision and quality must be maintained. To accomplish this, a vast army of men and women must acquire new skills in the shortest possible time.

To help you train new lathe operators, we offer the practical aids listed below. These books and films on lathe operation have proved effective in hundreds of apprentice training schools, including Army and Navy training stations.

Write for Information on These Practical Training Helps

MOTION PICTURES—"The Lathe" and "Plain Turning"—two 16 mm sound films in color on lathe operation. Available on a free loan basis for apprentice training. Showing time 20 minutes each. Write for circular.

HOW TO GET THE MOST OUT OF YOUR LATHE—Specialized service bulletins on the care and operation of engine lathes. H-1, "Keep Your Lathe Clean"; H-2, "Oiling the Lathe"; H-3, "Installing and Leveling the Lathe"; H-4, "Keep Your Lathe in Trim." Sample copies mailed on request.

HOW TO RUN A LATHE—A practical 128-page operator's handbook. 360 illustrations. Written in simple, non-technical style easy for the beginner to understand. Used as a shop text book by the Army, Navy and Air Corps. Price 25c. Sample copy free to apprentice supervisors.

THREAD CUTTING—21-page book, "How to Cut Screw Threads in the Lathe." Shows how to set up a lathe for cutting various pitches of screw threads; setting cutter bits; screw thread formulae; metric threads, etc. Price 10c. Sample copy free to apprentice supervisors.

GRINDING CUTTER BITS—12-page book on grinding lathe tool cutter bits. Covers identification and application of various bits, methods of grinding, correct angles, etc. Price 10c. Sample copy free to apprentice supervisors.

ARMY E NAVY

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LATHE BUILDERS FOR 36 YEARS — SOUTH BEND, INDIANA

SOUTH BEND

★ Schloemann "Motor-Rollers" are instrumental in increasing plant efficiency due to their simple design and rugged construction.

The squirrel cage motor, contained within the roller, and with no electrical connection to the rotor, represents the simplest piece of apparatus for converting electrical energy into mechanical work.

Mechanical design of the "Motor-Roller" with anti-friction bearings and a minimum number of rotating parts reduces operating and maintenance costs and avoids delays.

Scale tables, such as those illustrated above, provide flexible operation under start—stop—reversing service and possess the advantage of free access along both sides of the table.

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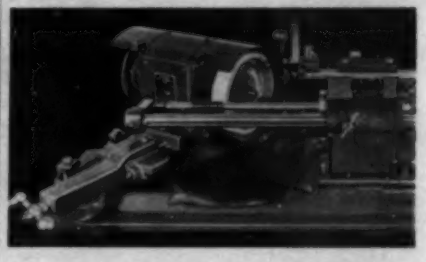
ENGINEERING CORPORATION
1108 EMPIRE BUILDING PITTSBURGH, PENNA.
HYDRAULIC PRESSES • ROLLING MILL MACHINERY

enough to allow the head to be swiveled for chamfer angle, advantageous when sharpening shell type taps, or taps with long pilots, as the work must clear the wheel head yet be rigidly supported.

The No. 2 machine is equipped with a longer feed screw for clearing the bed



when the wheel head is swung to the extreme rear position. Change gears are provided for sharpening 2, 3, 4, 5, 6, 8 or 10 flutes, right or lefthand. Taps can be held in bushings for rapid operation or in collets or between centers, if user prefers these methods. All three ways are available.

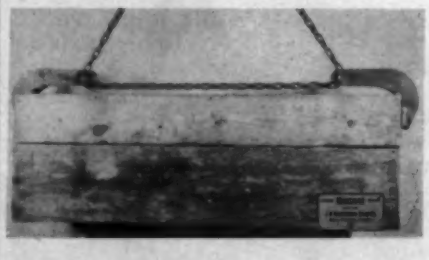
Safety Sleeve Holder

M. E. Cunningham Co., 172 East Carson street, Pittsburgh, is marketing a safety sleeve holder designed to leave a clear, even impression in marking on small, round and square pieces. It is said to be especially adaptable for marking gun barrels, small tubes and also for numbering stock in warehouses or storerooms. Outside frame of the holder is sturdy and the legs to the frame are grooved for use on small rounds. The top section, surrounding shank of type holder, is knurled for positive grip, and a special pin, easily removed for quick change of steel type inserts, holds the holder in place.

The device is being offered to handle any size or number of characters.

Versatile Grab

J-B Engineering Sales Co., New Haven, Conn., is offering a new type 1067 Mansaver grab for handling boxes of varying lengths. It consists of two comparatively light gripping ends with



pointed gripping face.

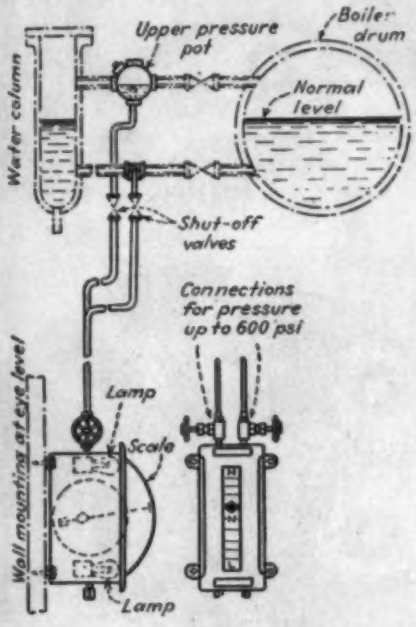
Lifting and gripping are by means of a chain. The illustration shows the grab handling one size box. For handling narrower boxes the chain length may be

shortened by hooking on to the attachment shown on the grab ring. The grab is being offered in sizes of ½ to 10 tons. One or more may be used on a spreader bar for handling wide, long crates, the company states.

Water-Level Indicator

Yarnall-Waring Co., Philadelphia, is offering a new water-level indicator which shows the water level in a boiler drum. Instrument is operated by differences in pressure in connecting tubes which is merely the difference in head between fixed water level in the upper pressure pot and varying water level in the boiler drum.

Pressure differential acts on Neoprene diaphragm. Pin transmits net diaphragm force to spring-metal deflection plate, moving powerful permanent magnet along tubular well containing spiral arma-



ture of magnetic material. Thus rotation of armature and, corresponding greatly-magnified motion of pointer, is in direct proportion to movement of diaphragm, actuated by changes in static head.

Magnetic principle permits complete separation of pressure parts from non-pressure parts without stuffing boxes. Thus magnet and deflection plate are in pressure chamber, whereas, the jeweled-bearing armature in the tubular well operates freely without packing and at atmospheric pressure.

Magnet and spiral armature are equivalent to a worm wheel driving a steep-pitch worm except that normal tooth friction between wheel and worm is eliminated.

Balanced black pointer, attached to armature and revolving with it, registers changes in boiler water level on illumi-

SUPER-FLEXIBLE RUBBER COVERED WELDING CABLE

"MAJOR" is the fastest selling welding cable on the market today, because it's so tough, durable and EXTREMELY FLEXIBLE—because it combines low cost with highest quality. Leading shipyards, arms plants and other wartime industries have learned to rely on MAJOR'S reputation for quality and our ability to make prompt shipments delights every customer.

SPECIFICATIONS

Size	Amps.	Strands	O.D.	I.D.	Wt. in lbs. per M ft.
6	75	950	.400	.210	132
4	125	1029	.495	.275	202
3	150	1323	.500	.305	235
2	200	1666	.560	.335	295
1	250	2156	.625	.400	373
1/0	300	2646	.675	.440	450
2/0	375	3381	.750	.490	570
3/0	450	4284	.815	.545	705
4/0	550	5376	.900	.635	860

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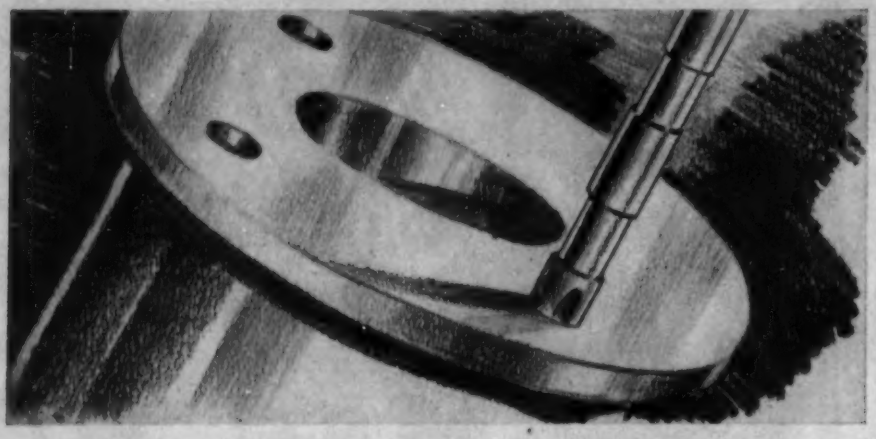


How Cleaner Castings *Increase Tool Life* and Improve Inspection

AIRLESS Wheelabrator abrasive blasting leaves metal products lustrous and perfectly clean, because it scours every trace of sand and scale away from the base metal.

Results: Machining and grinding are speeded up, tool life is greatly prolonged, inspection is simplified.

Example: Bronze Alloys Co. of St. Louis replaced their wet tumbling process with a 20 x 27" Wheelabrator Tumblast for cleaning bronze and aluminum castings. The improvement in tool life in machining Wheelabrated castings was quickly noted by their customers, with the result that a Wheelabrated finish is now specified on practically all casting orders received.

Of equal importance was the fact that the Wheelabrator cleaned out cracks and fissures which previously had not been visible on inspection. Unfortunately such defects were not discovered until subsequent machining operations. Now, imperfections are revealed before the castings leave the foundry, and it is seldom that a Wheelabrated casting from Bronze Alloys is rejected as imperfect by a customer.

The full story about these and other profitable advantages of the Wheelabrator are yours for the asking. Why not write us about them today?

World's Largest Builders of Airless Blast Equipment

AMERICAN FOUNDRY EQUIPMENT CO.

509 S. BYRKIT ST., MISHAWAKA, IND.

nated scale that shows green for normal operating range and red at high and low levels.

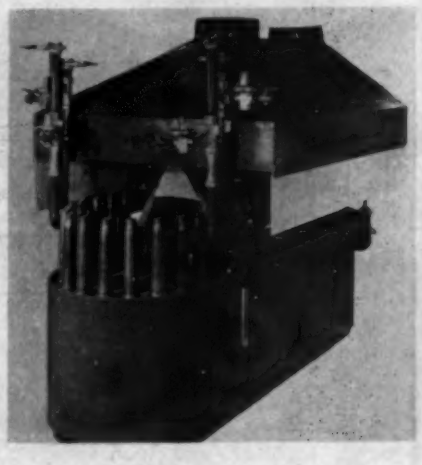
Annealing Machines

Morrison Engineering Co., Cleveland, announces three new flame-type mouth and body annealing machine models for steel cartridge cases. These handle cases of 37, 40, 57, 75, 90, and 105 millimeters, including 3-inch cases.

Model 3740 will handle all 37 and 40 millimeter cases. The 57, 75 and 105 millimeter cases are handled by the model 5710, and model 390 takes care of the 90 millimeter and 3-inch antiaircraft cases. All three units are basically of the same design—the difference being size.

Production capacity of the various machines, it is reported, is arranged to balance with the average steel cartridge case production line.

The equipment includes a steel conveyor chain placed on its side and driven by a variable-speed drive through a totally enclosed worm gear reducer. The chain carries double row, ball bearing mounted spindles every pitch. These, in the form of a V-belt pulley, are rotated by a V-belt backed up by adjustable



ball-bearing wheels or, in certain models, the spindles are sprocket equipped and driven by an adjustable steel roller chain. The spindle rotating mechanism is driven by a separate motor which is provided with its own variable speed unit and a totally enclosed worm gear speed reducer. Work holder adaptors which are interchangeable for different size cases are bolted on top of the rotating spindles.

The burner equipment is of the blast line type with zero governors and proportional mixers provided for each burner. Manometers also are provided for each burner.

By operating at comparatively high mixture pressures, and by rotating the work from 60 to 100 revolutions per min-

THE U.S.S. OKLAHOMA IS RIGHT SIDE UP

AMERICAN CABLE TRU-LAY PREFORMED WIRE ROPE DID THE PULLING

Official U. S. Navy photograph

Pearl Harbor, Hawaii. Even Date—The 29,000 ton U.S.S. "Oklahoma" is again afloat. During months of preparation by the Pacific Bridge Company, some 50 miles of TRU-LAY Preformed and CRESCENT Non-Preformed wire rope (ranging in diameter from 1″ to 3″) was shackled to the huge ship, then in less than 69 hours operating time the "battlewagon" was pulled out of her list of 151 degrees back to within 10½ degrees of natural position.

For this spectacular job, a sling or bridle was put over the ship. This bridle was made of 42 lengths (averaging 360′) of 3″ CRESCENT Non-Preformed rope. Attached to this were 21 reels (10,000′ each) of 1″ TRU-LAY Preformed wire rope. These were attached to winches ashore, and after less than three days steady pulling, the "Oklahoma" was right side up.

The American Cable Division, not only for this shining example but for its less spectacular day-in and day-out effort, is proud to be numbered among those who are working to speed the war's victorious end.

AMERICAN CABLE DIVISION Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Portland, Tacoma

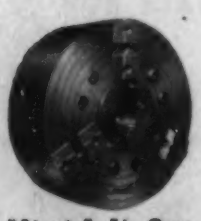
AMERICAN CHAIN & CABLE COMPANY, INC.

BRIDGEPORT, CONNECTICUT

ESSENTIAL PRODUCTS . . . TRU-LAY Aircraft, Automotive, and Industrial Controls, TRU-LOC Aircraft Terminals, AMERICAN CABLE Wire Rope, TRU-STOP Brakes, AMERICAN Chain, WEED Tire Chains, ACCO Malleable Castings, CAMPBELL Cutting Machines, FORD Hoists, Trolleys, HAZARD Wire Rope, Yacht Rigging, MANLEY Auto Service Equipment, OWEN Springs, PAGE Fence, Shaped Wire, Welding Wire, READING-PRATT & CADY Valves, READING Electric Steel Castings, WRIGHT Hoists, Cranes, Presses . . . *In Business for Your Safety*

Output Will Go Up MORE THAN 25% WHEN "AIRGRIP" HOLDING DEVICES ARE INSTALLED

"Airgrip" Revolving Air Cylinders—positive and powerful.



"Airgrip" Air Operated Chucks—self-locking—save time and effort with safety.

Here is a simple formula that will speed up your production more than 25% whether you employ men or women machine operators. *Equip machines with "Airgrip" Revolving Air Cylinders and Air Operated Chucks.*

Old employees, relieved of time-wasting muscular effort, will make new production records. New employees, given minimum instruction, will produce at the full capacity of your machines—and, because "Airgrip" Holding Devices are so easy to operate, women will stay on the job a full turn without overtaxing their physical strength.

Act today to get higher production and lower cost. "Airgrip" Holding Devices are available on short notice—they are easy to install—their cost is moderate—they pay big dividends from the first day of operation.

This kind of "muscle grinding" penalizes you by more than 25% of potential output. Your machines will produce at full capacity as soon as you install "Airgrip" Holding Devices.

Anker-Holth also manufactures "Airgrip" stationary cylinders, and hydraulic cylinders. Our engineers are ready to help you on any problem where pneumatic or hydraulic adaptations can be made to machines.

Write for the new "Airgrip" Bulletin!

Anker-Holth Mfg. Co.

"Airgrip" Chuck Division

332 S. Michigan Ave. Chicago, Ill.

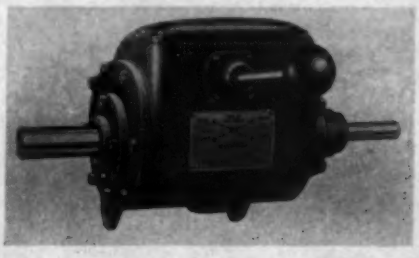
ute in front of the burners, extremely fast heating is attained. Due to the rotating speed of rotation there is no perceptible cooling even on the large size cases. Burners are adjusted and arranged to provide a holding or soaking zone, in addition to the heating zone. Loading and unloading is a continuous manual operation at one end of the machine.

A sheet metal hood with vent encloses the operating mechanism; hinged sides permit easy burner adjustment.

When close control of temperature in the lower part of the cartridge case is necessary to prevent annealing beyond a definite point, a cold blast blower may be incorporated into the machine. Floor space required is low considering the output of these machines. For the 105 millimeter case machine, it is only 3½ x 10 feet.

Left-Hand Transmissions

Western Mfg. Co., 3400 Scotten avenue, Detroit, now is offering left hand output models of both the Master (1-5 horsepower) and Major (5-10 horsepower) transmissions making the transmissions



more flexible in motorizing cone-driven machine tools.

Used together with its multimotor-mount, which comes in three models—one for lathes, automatics, bolt cutters, etc.; one for shapers, boring mills, vertical millers, slotters, etc.; and one for milling machines—the left-hand units provide a flexibility of application said to take care of unusual problems.

Hydraulic Press

Colonial Broach Co., Detroit, is now offering its improved Junior hydraulic press as a base type unit besides as a bench model.

Incorporation of a base for this machine makes possible its application even to "pull-down" type broaching operations, according to the company. The puller mechanism and coolant tank are located in the base, while a coolant pump driven by an integral motor is provided on the rear of the base.

In addition, the base type machine may be used for push type broaching operations requiring the use of coolant. For assembly operations the base type model is offered without coolant reservoir and pump.

d-c power problems?

investigate

ignitron

SERVING WAR INDUSTRY

Today, the Ignitron Rectifier is widely accepted as the answer to many power conversion problems. More than 2,000,000 installed capacity is now serving vital war industries.

Wherever you need efficient, dependable power conversion in the 250-volt and higher range—that's a job for the Ignitron Rectifier.

Ignitron operating costs are low. Simplified automatic operation, low arc drop loss, the elimination of high starting demand and absence of major moving parts hold both operating and maintenance costs at a minimum.

Installation is easy, too. No special foundations are required. An Ignitron can be installed on any level floor of reasonable strength.

And most important of all is the uniformly high efficiency of Ignitron power conversion. It can handle constant 24-hour loads, peak loads, or light loads, all with the same relatively high efficiency.

It will pay you to investigate the advantages of Ignitron for your particular d-c power requirements. Your nearest Westinghouse office can give you full information. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

in the steel industry

The inherent advantages of the Ignitron Rectifier make it ideally suited for steel mill service. The outstanding feature is the practically straight line efficiency from light load to overload. Also, since there are no major moving parts to be affected by dirt and grit, the Ignitron requires less maintenance. Operation can be completely automatic to provide unattended service.

For further information about the Ignitron Rectifier, write Dept. 7-N for your copy of Book B-3024.

J-10244-1

Westinghouse *Electronics at Work*

IGNITRON RECTIFIERS

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

Fighting Aircraft

(*Continued from Page* 90)

holding devices, full arc turns, geared movements, streamlined supports. Old methods of hand drilling and bending have been eliminated. Great Minster presses employing air ejection cushions, perform unusually deep draws in duraluminum.

The fabrication of the bulkhead diaphragm is an example. Under the old operation the sequence necessitated these steps—shear metal, trim to approximate size, stack these flats in piles 1 inch thick, route along templet at top of stack, drill with undersize holes, templet removed, burr and refine routing. Since only 12 flats could then be handled to the inch, this would have to be repeated constantly. Now the only requirement is to shear, strip, blank, pierce full size holes and form, and the bulkhead is ready for assembly. Routing will soon be entirely eliminated.

Skins are blanked in soft annealed condition, heat treated and placed in a huge refrigerator at zero degrees Fahr. temperature until ready for forming. This effectively prevents age hardening.

In the old method of assembly, holes were undersized. The templet had to be applied, work drilled, templet removed, holes burred and inspected. Now the holes are there for the worker. If one is right, 1000 will be right. Rework and rejections are reduced tremendously.

It is estimated that spare and replacement parts amount approximately to one-third the total warplane cost. The P-47 Thunderbolt is primarily a fighter plane. In combat operating under tactical conditions, its requirements are unpredictable. A typical spare parts list approximates 200 separate items. These are only those that are vulnerably positioned or subject to wear. They are what is required to keep the plane in combat condition. A grounded plane is of no value. Facility of spare parts and rapid, accurate replacement is a dominating consideration. Think, then, of the tremendous advantage that the Indiana Division has created through its interchangeable part, fully tooled, sectionally fabricated fuselage assembly in "keeping them flying".

These advanced mass production assembly methods have great advantages in simplifying training of new workers. The Indiana Division maintains a large training school with courses that are more standardized and of shorter periods, because assembly is almost entirely a riveting job. Women are being hired and trained in increasing numbers. Their performance at work has been unusually good. In many applications, they are more dextrous than men. "The only problem with women," Mr. Dubusker commented, "is to keep them occupied. They work excellently as long as they are kept busy. We try to prevent them from letting their minds wander."

Time, Material Saved by New Induction Operation

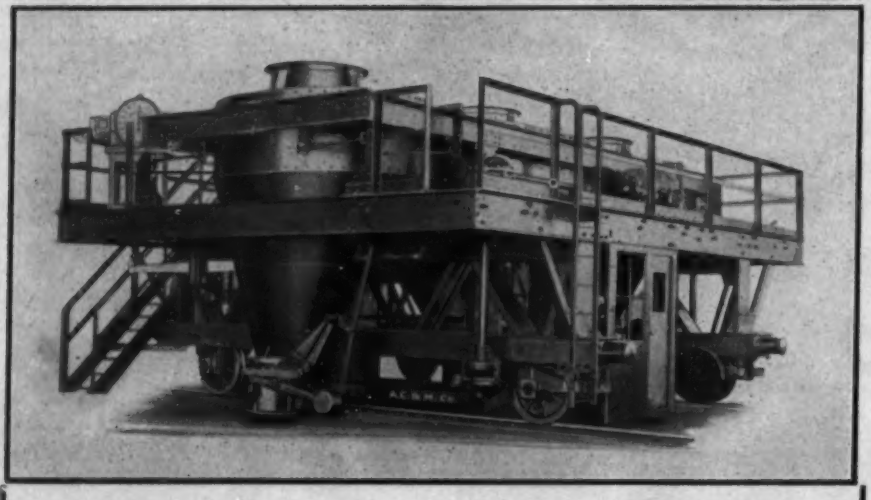
A Tocco induction fixture recently redesigned by Ohio Crankshaft Co., Cleveland, is speeding heat treating operations, saving steel and relieving forging facilities for a midwest manufacturer producing diesel engines for Army tanks.

Used on vital engine balancer shafts, the Tocco induction treatment is said to harden a bearing surface and at the same time a thrust face while brazing collar to the shaft. The entire three-way operation is done simultaneously in 41 seconds.

Originally, the bearing end of the balancer shaft was turned down to size from bar stock the diameter of a collar forming a thrust face at the shaft's end. Some metal was wasted in the process. It was necessary to copper plate the end and carburize the piece.

A second method tried involved hot upsetting from nominal diameter stock, machining, hardening bearing surfaces

COKE OVEN EQUIPMENT



COAL CHARGING CARS

Atlas coal charging cars are preferred equipment on most ovens because they are designed to suit operating conditions exactly, and include those design features which insure dependable operation with low maintenance.

* * * * *

ATLAS COKE OVEN EQUIPMENT

Clay Carriers • Charging Cars • Door Machines
Coke Guides • Quenching Cars and Locomotives

The ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

1100 IVANHOE RD. CLEVELAND, OHIO, U. S. A.

and grinding to finish. This was supplanted by the new induction treatment, the indicator being modified to include brazing a separate collar to the shaft. Specifications calling for Tocco hardening eliminated carburizing material, the time required for packing and other previous operations.

Under the latest process a hardness of 56-58 rockwell on the thrust face and 50-55 rockwell on the bearing surface is effected. Distortion is said to be wholly lacking.

Stress Relieving

(*Continued from Page* 96)

with the need for stress relieving as it is with the practice.

Below 600 degrees Fahr., a temperature difference of less than 200 degrees Fahr. is enough to introduce residual stresses equal to the yield point of the material.

For this reason any stress relieving heat treatment should be subjected to rigid control. Most specifications require heating at the rate of 300 to 350 degrees Fahr. per hour until the stress relieving temperature of 1150 degrees Fahr. is reached.

The weldment is usually maintained at the holding temperature for one hour per inch of thickness. Then the entire assembly is cooled s'owly, again between 300 to 350 degrees Fahr. per hour, until it has cooled below 200 degrees Fahr. *Uniform cooling is most essential or temperature differences will be found in the unit that will serve to bring about a new group of residual stresses every bit as harmful as those removed by the heat treatment.*

Some specification writing groups have been over-zealous in their adoption of holding times. In fact more than one instance is on record where the holding times have been incompatible with the required minimum yield strengths and ultimate strengths. Longer holding periods tend to lower both of these strength factors as may be seen in Fig. 5. At the same time that the strength elements are reduced, the ductility indexes display an increase.

Sometimes specifications covering the stress relieving of weldments allow a range such as from 1100 to 1250 degrees Fahr. which is permitted by the pressure vessel codes of both the ASME and the API-ASME. Still other codes or design requirements allow other temperatures. As a general rule, higher temperatures have the same effect on resulting properties as longer holding times. Fig. 6 shows this relation.

Both Figs. 5 and 6 are based upon weld metal from AWS-ASTM Grade E6020 electrodes. Different values although identical trends will be found for other electrode deposits in the E60XX group. There are conditions in Fig. 5 and in Fig. 6 that may prevent reaching a minimum yield strength of 50,000 pounds per square inch. Therefore inability to make minimum yields may force the fabricator to use an alloy electrode.

In alloyed weld metal the same simple relationships may not hold. Almost without exception, the ductility of the weld is improved by stress relieving. *However the yield strength and ultimate strength may decrease, stay the same or increase depending upon the response of the alloy combination to the heat cycle used for stress relieving.*

These unusual properties are responsible for the increasingly widespread application of complex alloy weld metals to particular welding problems.

The stress of new demands placed upon welding is being met by proper heat-treat cycles. Treatment of the steel prior to welding or after welding brings about a new combination of mechanical properties that may be extremely useful.

Preshaped parts, accurate assembly and stress relieving are being combined to save machining work and also the metal.

You won't have to catch up, if you get ready now to meet the competition that will return with war's end. War Production is settling "in the groove." Your designers and engineers are beginning to emerge from the pressure of overtaking demand. The pace of bond buying has been stepped up and the spirit of free men is inspired to greater and protracted effort by the assurance that Victory can be speeded.

Full Victory will be attained only after the war has been won, by preparation for filling the pent-up and repressed needs of millions of people, here and abroad—needs that will call imperatively for satisfaction.

Manufacturers will face new tasks, new pace, the need for new productive equipment—some of it entirely new, with greater capacity, closer tolerances, more accurately controlled, with more of the characteristics that justify the expression "nearly human." . . . Such a machine may even be emerging from your mind as an embryo model.

Let FIDELITY help you incubate this model into a practical unit so you can enter the race for peace production with a running start.

Meanwhile write for our booklet, "Facilities."

Designers and Builders of Intricate, Automatic Precision Machines

32 YEARS' EXPERIENCE

FIDELITY MACHINE COMPANY

3908-18 FRANKFORD AVENUE, PHILADELPHIA, PA.

WOOD OR METAL

PATTERNS

★

NON-FERROUS

CASTINGS

TO YOUR EXACT

Specifications

★ Extra operations and unnecessary loss of time can be avoided by sending your order to Wellman. Here patterns are made and castings produced to the exact specifications of customer's blueprint.

We make patterns of any size, kind and design for use in our own or outside foundry.

Castings produced in Ampco Bronze, Wellcast Brass, Magnesium, Bronze and Aluminum Alloys.

THE WELLMAN BRONZE & ALUMINUM COMPANY

General Offices

2539 E. 93rd Street • Cleveland, Ohio

Wellman

MEANS WELL-CAST

Clean Inside, Too

(*Concluded from Page* 98)

ing required changes in a number of our machine patterns in order to make settling pockets which drain into the pipe leading to the settling tank. Where the hoses are attached to the machine, we employ special covers provided with hose connections.

By flushing our machines in this manner, we have virtually eliminated any possibility of polished, precision-ground surfaces collecting dirt or grime that may be present on the interior surfaces of the machine. The results have supported our claim that machines made for precision work should be as clean inside as they are outside.

New Quenching Solution Simplifies Hardening

A hardening solution for use with carbon, alloy and high-speed steel tools, etc. which is said to simplify the procedure of heat treating cutters, dies, shear blades, machinery parts, etc., is announced by Steeltem Chemical Co., 51 East Forty-second street, New York.

This chemical solution, when used in place of water or oil for quenching, eliminates subsequent drawing operations. In the case of a cold chisel, for instance, the procedure is as follows: Forge to shape; reheat to about ½-inch back of cutting edge—then quench in "Steel-temp" solution which has been thoroughly mixed; then finish by grinding the cutting edge.

This solution is furnished in 5, 10, 30 and 55-gallon containers in which work can be quenched directly, thus insuring its use at original consistency and obviating rehandling.

Counting Devices

(*Continued from Page* 108)

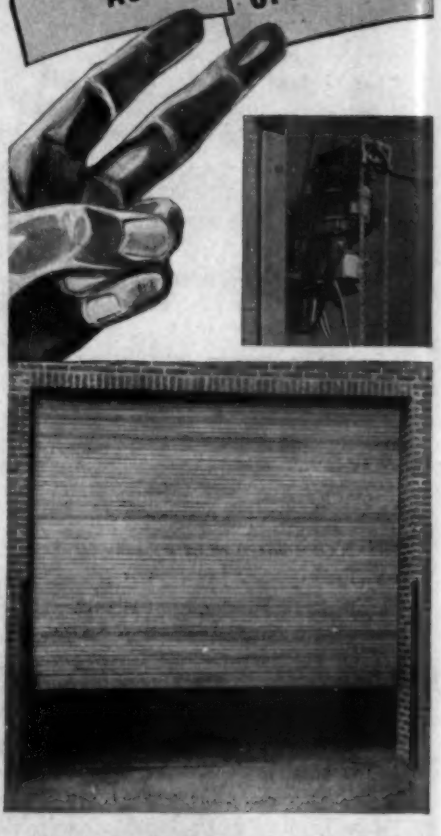
that operate the rolls, the blowers, and other subsidiary equipment is controlled automatically at each machine by a breaker switch, so that in the event of trouble, the current shuts off before the machine or motor can be damaged. A counter on each of these breakers registers the number of times the switch operates, and an excessive count indicates trouble that should be investigated.

Where steam is used as a source of power, the coal fed to the boilers by automatic stokers is measured by counters, registering the number of tons used. Where gas is employed as the heating element, the amount used is registered on a counter so constructed that it compensates for the pressure as it varies, so that the counter-register is the exact

TWO VITAL DOOR ADVANTAGES FOR WARTIME NEEDS

COILING UPWARD ACTION

MOTOR OPERATION



KINNEAR WOOD ROLLING DOORS

Kinnear *Motor Operated* Wood Rolling Doors can be opened or closed quickly at the touch of a button — from any convenient location! The rugged, heavy-duty motor does the work, saves valuable time and labor.

And coiling, upward action saves valuable floor, wall and ceiling space. The doors stay out of the way when open, safe from wind or traffic damage.

Strong inter-lapping wood slats form a rugged curtain that blocks out wind and weather, yet presents a neat appearance.

Kinnear Wood Rolling Doors also assure highest economy of war-vital metals!

They are built in any size, for use in old or new buildings. Manual control only, if desired. Write for details today! The Kinnear Mfg. Company, 1780-1800 Fields Ave., Columbus 16, Ohio.

Saving Ways in Doorways

KINNEAR ROLLING DOORS

amount of gas consumed, regardless of the pressure. In other cases where gas is used and the amount is registered on a pressure chart, a device is used to integrate these charts, and the total number of cubic feet consumed is registered on a direct-reading counter.

Innumerable applications of counters are found in the offices. They automatically count the number of telephone calls on any one line and the number of copies of orders produced on duplicating machines. They are used in compiling payrolls, and for measuring production of typewriters. Even the personnel of a mill is largely recorded and controlled by the use of automatic counters. Some use turnstiles to count the persons entering and leaving the gates. Others use photoelectric tubes for registering, the record being made on a counter. Foremen and superintendents frequently carry hand counters for checking various activities under their control.

If by chance all counting mechanisms were removed from any mill at one time, the confusion resulting would, no doubt, close the mill. Hundreds of applications have been found and others are being developed, as new processes are being devised.

Weight-Lifting Injuries

(*Continued from Page* 116)

possible with his normal walking gait.

Here is an evaluation of some common methods of carrying in the light of these considerations.

Load carried directly in front of the worker at waist level: This practice places heavy strain upon the shoulders, arms, wrists and fingers. It interferes with forward vision. It tends to pull the worker forward, throwing him off balance.

Load carried in hand by handle or rope: If there is an object in both hands, this method has the advantage of not disturbing body balance and permitting usual walking gait. However, heavy strain on hands and arms and drag on the shoulders makes it impractical for long-continued work.

If load is carried on only one side, this method throws the worker off balance. Sharp-cornered objects are difficult to carry in this position. Loads carried on both sides eliminate the disturbance of balance. The method may be satisfactory for work of short duration, but since it tires the arm and results in rubbing of the side and hip, it is not practical for continuing over a long period.

The load carried on one shoulder and balanced by the hands: This method is

Perforated
METALS
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As used in the processing of Grain, Food Products, Petroleum, Metals and for other important and essential industries.
Any Metal
Any Perforation
The Harrington & King PERFORATING Co.
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Carbozite Over Seas
SHOP COATING

For the protection of metal and metal parts, finished and unfinished—in storage or for overseas shipments.

Used for several years, Carbozite O. S. Shop Coating has been developed and produced to meet specifications of various governmental departments, Lend-Lease provisions, and is ideal for industrial war production applications.

Applied by brush, dip or spray. Drying time—15 to 30 minutes. Quickly and easily removed by naphthas at destination.

Write for data!

CARBOZITE CORPORATION
First National Bank Building
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Youth may spring eternal, but only springs embodying SCIENTECH *design can remain youthful.*

LEE SPRING COMPANY, INC.
30 MAIN STREET — BROOKLYN, N. Y.

generally satisfactory. Disturbance of balance is at a minimum. There is no undue strain on the hands or arms. There is no interference with walking. Because of the height at which the load is carried, it is well to have assistance for the worker in loading and unloading. This is particularly true in the case of women because of the strain upon the abdominal muscles in raising the load above shoulder level.

The load is carried at or near the nape of the neck—similar to the method in which soldiers carry knapsacks. This has the same general advantages as the shoulder carry, with the added advantage of placing the weight squarely between the shoulders. Unless some form of harness is provided, there may be strain on the hands and arms in holding the load. Here again it would be well to provide assistance in loading and unloading because of the height at which the load is carried.

When the load requires carrying by two or more workers it is essential that the workers be of the same general height and physique, and that they keep in step while they are carrying. Where two workers are carrying some such object as a beam or rail, the object should be carried preferably on opposite shoulders.

Microscope in Research, Industry and Science

The Microscope and Its Use, by Frank J. Munoz and Dr. Harry A. Charipper; cloth, 334 pages, 5½ x 8½ inches; published by Chemical Publishing Co. Inc., Brooklyn, N. Y., for $2.50.

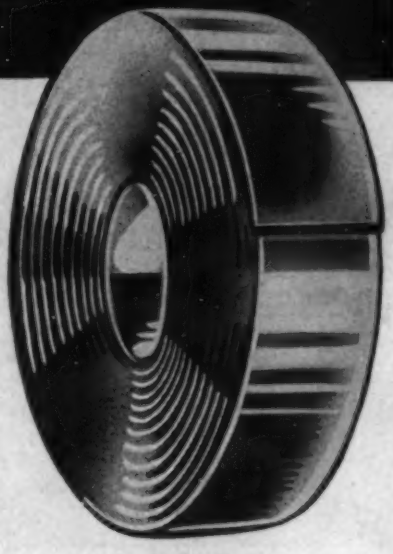
This is a technical book in non-technical language. One author is a professor of biology in a leading university, with experience in routine laboratory and research work. The other has been connected for many years with one of the largest manufacturers and distributors of microscopes. This is the first volume that covers the field of microscopy from the joint positions of these experts.

Aside from its use in research the microscope finds its greatest use as a technical aid or tool and has been developed to fill specific needs, resulting in development of many types and many attachments.

To know how to use this instrument and care for it is essential and this volume answers most of the questions that arise in both simple and specialized microscope use, with practical instruction and advice. A chapter on the microtome also is included.

The volume contains a glossary, a bibliography and an index of subjects and illustrations.

SUPERIOR



HOT and COLD ROLLED STRIP STEEL

Carbon-Alloy STAINLESS and SuVeneer Clad Metal

SUPERIOR STEEL CORPORATION
CARNEGIE, PENNA.

Civilian Goods Materials Prospects Unpromising

(*Concluded from Page 58*)

essentials that will permit the civilian population to maintain itself in sound and vigorous condition in order to produce at maximum efficiency for war."

The OCR report cites the high civilian standard of living maintained during the past three years, and gives the following table showing real volume of consumer expenditures (in 1939 dollars) in billions:

YEAR	GOODS	SERVICES	TOTAL
1939	39.0	22.7	61.7
1940	41.3	23.8	65.1
1941	45.1	24.9	70.0
1942	43.4	26.2	69.6

While the Civilian Requirements office is advocating a program intended to protect the civilian economy without pampering it, war materials procurement officials are strongly opposing any allocations of critical metals which might interfere with the effort to spur lagging munitions and aircraft output.

Army and Navy authorities are reported to have combined forces to combat the $30,000,000 farm-machinery program recommended by the Office of Foreign Relief for rehabilitation of areas captured from the enemy. They contend this plan would divert bearings and axles needed for military vehicles and the program for auto parts may be opposed on the same grounds.

Policies Carefully Scrutinized

However, the policies of the OCR are all carefully scrutinized before their approval by the Civilian Requirements Policy Committee. Stated briefly, the OCR policies are:

To satisfy all minimum essential civilian requirements. To avoid reducing civilian supplies when it would unduly impair civilian health, morale or working efficiency, or the national economic structure. To provide adequate repair parts and labor for maintaining existing essential civilian equipment. To continue distributive and service trades. To provide for needs of such groups as new families, infants and children, workers with special requirements, and rapidly growing communities. To furnish public information on reasons for government decisions limiting civilian goods and services.

The Office of Civilian Requirements confronts a difficult task in securing close to adequate allotments for even its indisputably urgent needs. Some of these requests are now being challenged by other agencies.

With this set of circumstances, can civilian goods justifiably expect larger allotments of critical materials in the near future?

DEGREASE YOUR STEEL PARTS FASTER BEFORE CADMIUM PLATING

By Using

OAKITE COMPOSITION No. 90

Are you cadmium plating war products and parts made of steel? Then you know how important it is FIRST to get ALL surfaces CHEMICALLY CLEAN! Drawing, stamping, buffing compounds, smut, shop dirt, oil and grease . . . ALL must be completely removed if a durable, uniform finish is to be obtained.

Specially designed for anodic degreasing, Oakite Composition No. 90 fully meets this exacting production requirement. In addition, it is safer to use. Its low foam density does not permit hydrogen to build up in quantity. The result is greater safety from explosion due to arcing.

Complete Data *FREE!*

Used in plants the Nation over, Oakite Composition No. 90 is proving to be today's best wartime answer to the problem of cleaning steel by reverse current before cadmium plating. Find out what it can do to help expedite your production! Complete data FREE on request. Write TODAY!

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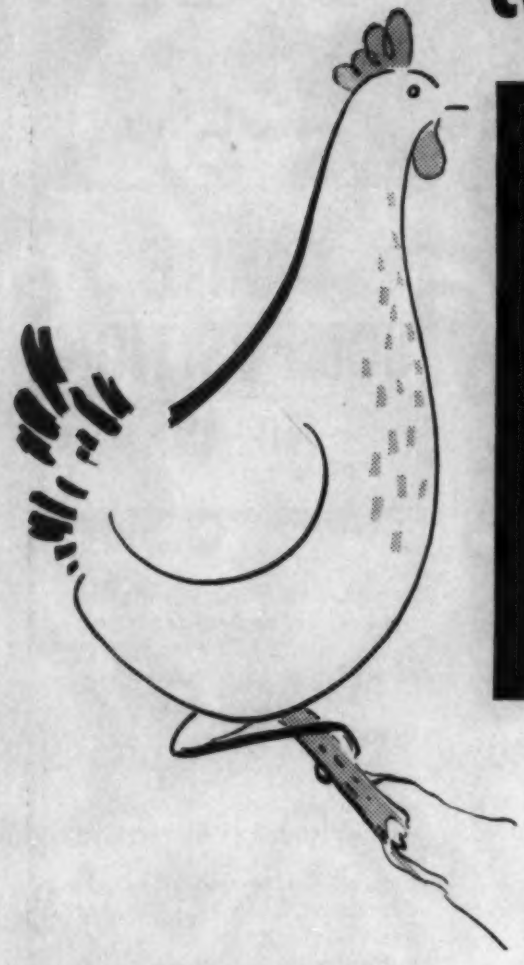
Technical Service Representatives Located in All Principal Cities of the United States and Canada

OAKITE *Specialized cleaning*
MATERIALS & METHODS FOR EVERY CLEANING REQUIREMENT

No "chicken-necked" SOCKET SCREW can survive this Twist...



Brutal overloads applied in Torque Test make sure P-K Socket Screws will more than meet setting-up stresses . . .

To make sure you get no "chicken-necks" among Parker-Kalon Socket Screws, thorough tests are made in the P-K Laboratory with this steel-muscled twister that develops torsional stresses far beyond normal. For example, a P-K ½"-20 (N.F.) Cap Screw must withstand a 2200 inch-pound minimum load. These tests make sure that any P-K Socket Screw can be set up as tight as required without danger of the head twisting off.

The torque test is only one of 16 check-ups made to assure the unfailing performance of P-K Cold-forged Socket Screws. This rigid routine of *quality control* eliminates the "doubtful Screws" – screws that *look* all right, but some of which fail to *work right*. Socket Screw users need this protection today more than ever. Specify "Parker-Kalon" next time you order . . . it costs no more. Parker-Kalon Corp., 194-200 Varick St., New York 14.

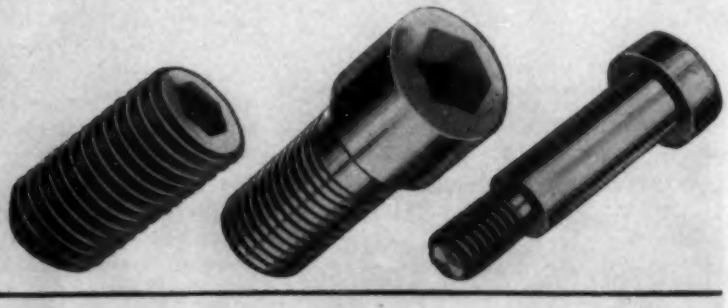
This 16-point "Quality-Control" protects P-K Socket Screw Users

1–Chemical Analysis. 2–Tensile Strength. 3–Ductility. 4–Torsional Strength. 5–Ability to take Shock Loads under Tension. 6–Resistance to Shock Loads under Shear. 7–Hardness. In addition, there is a rigid inspection of these essentials: 8–Head Diameter. 9–Head Height. 10–Concentricity of Head to Body. 11–Socket Shape. 12–Socket Size. 13–Socket Depth. 14–Centricality of Socket. 15–Class 3 Fit Threads. 16–Clean Starting Threads.

PARKER-KALON

Quality-Controlled

SOCKET SCREWS



Steel Buying Slackens With Year's Output Sold

Current bookings below July rate. . . Railroad needs recognized by releases for car building. . . Plate production below last year. . . Pig iron users taking less tonnage

DEMAND
Current orders light.

PRODUCTION
Up ½-point to 98½ per cent.

PRICES
Unchanged.

WITH deliveries well extended on most steel products and most claimant agencies not in position to ask sweeping allotments for first quarter, orders generally so far this month are off noticeably.

This is particularly true in plates, bars and sheets, the major tonnage factors at present. Demand for these is far from sluggish but is appreciably under July levels. Tin plate buying is also below the recent peak, due mainly to seasonal influences. Merchant pipe, shapes and most wire products maintain about the previous level. Shapes are a shade more active, as a result of recent orders from car builders and structural schedules are virtually covered for third quarter.

Distribution of fourth quarter steel under CMP, recently announced by the War Production Board came at a time when producers were largely booked for the remainder of the year. However, orders for fourth quarter were balanced against tentative allotments and kept within reasonable bounds, official announcement simply marking completion of broad details of overall division of tonnage. While demand for steel exceeded supply the necessary reduction is being accomplished, indicating progress toward realistic planning.

• • •

Existence of pressing needs of railroads for additional freight cars and for rail replacement is being recognized by Washington and the enlarged car building program has resulted in distribution of considerable steel for third and fourth quarters. While supply of plates is expected to be sufficient for this purpose some difficulty may be experienced in obtaining enough bars and small shapes unless special action is taken to provide these materials.

Steelmaking scrap is being received by melters in sufficient volume to support the current high rate of production but uneasiness is felt in some quarters over prospects for winter supply. Aside from industrial scrap tonnage is not heavy and in some cases cutbacks in war production have caused diminution of scrap offerings. Commercial yards are receiving less than usual from their regular sources and are handicapped in its preparation by lack of workers. Some steel mills which have not been buying actively for some time again are in the market for material to lay down for later use.

Pig iron melters in several districts have asked smaller tonnages for September, continuing the decline that has been noted for several months. This fairly general reduction in tonnage is attributed to difficulty in obtaining castings contracts and in some degree also to lack of manpower in foundries, workers having been attracted to other work by higher wages. This situation is not causing any disturbance in distribution as steelmaking furnaces can use whatever excess may develop and relining of blast furnace stacks is rendering some capacity idle.

Steel production last week edged nearer capacity, rising ½-point to 98½ per cent, in spite of hot weather, which usually takes toll. Chicago advanced 1½ points to 99½ per cent and Pittsburgh gained ½-point to 100½ per cent. Detroit was up 3 points to 90 per cent and eastern Pennsylvania advanced 2 points to 95. Cleveland declined 1½ points to 92½ and Cincinnati 2 points to 87. Rates were unchanged at Youngstown, 98; Wheeling, 94; St. Louis, 89; Buffalo, 90½; Birmingham, 95 and New England, 97.

• • •

Ingots and steel for castings were produced in July to a total of 7,376,017 net tons, compared with 7,027,101 tons in June, but failed to equal any other 31-day month this year. In July, 1942, production was 7,144,958 tons. In seven months this year total output was 51,242,929 tons, 1,562 048 tons more than the 49,680,881 tons produced in the corresponding period in 1942. Average weekly production in July was 1,668,782 tons, compared with 1,616.506 tons per week in July last year.

Shipments of finished steel by United States Steel Corp. subsidiaries in July were 1,660,762 net tons. 108,099 tons larger than the low mark of June but lowest for the month since July, 1940. For seven months the aggregate was 11,700,778 tons, less than in the comparable period since 1941. Only April and June shipments were less than in July, even the short February showing a larger tonnage.

Plate production in July is announced by the Iron and Steel Division of WPB as 1,089,677 tons, slightly more than the 1,059,360 tons in June, but falling below the 1,-124,118 tons produced in July, 1942.

Average composite prices of steel and iron products are steady at ceilings of Office of Price Administration. Finished steel composite is $56.73, semifinished steel $36, steelmaking pig iron $23.05 and steelmaking scrap $19.17.

COMPOSITE MARKET AVERAGES

	Aug. 14	Aug. 7	July 31	One Month Ago July 1943	Three Months Ago May, 1943	One Year Ago Aug., 1942	Five Years Ago Aug., 1938
Finished Steel	$56.73	$56.73	$56.73	$56.73	$56.73	$56.73	$58.00
Semifinished Steel	36.00	36.00	36.00	36.00	36.00	36.00	36.60
Steelmaking Pig Iron	23.05	23.05	23.05	23.05	23.05	23.05	19.05
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.17	14.55

Finished Steel Composite:—Average of industry-wide prices on sheets, strip, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material	Aug. 14, 1943	July, 1943	May, 1943	Aug., 1942
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.47	2.48	2.49
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.22	2.22	2.22
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pittsburgh	2.60	2.60	2.60	2.60
Tin plate, per base box, Pittsburgh	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55
Semifinished Material				
Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods, No. 5 to ⅜-inch, Pitts.	2.00	2.00	2.00	2.00

Pig Iron	Aug. 14, 1943	July, 1943	May, 1943	Aug., 1942
Bessemer, del. Pittsburgh	$25.19	$25.19	$25.19	$25.19
Basic, Valley	23.50	23.50	23.50	23.50
Basic, eastern, del. Philadelphia	25.34	25.34	25.36	25.39
No. 2 fdry., del. Pitts., N.&S. Sides	24.69	24.69	24.69	24.69
No. 2 foundry, Chicago	24.00	24.00	24.00	24.00
Southern No. 2, Birmingham	20.38	20.38	20.38	20.38
Southern No. 2, del. Cincinnati	24.30	24.30	24.30	24.06
No. 2 fdry., del. Phila.	25.84	25.89	25.89	25.89
Malleable, Valley	24.00	24.00	24.00	24.00
Malleable, Chicago	24.00	24.00	24.00	24.00
Lake Sup., charcoal, del. Chicago	31.34	31.39	31.54	31.54
Gray forge, del. Pittsburgh	24.19	24.19	24.19	24.19
Ferromanganese, del. Pittsburgh	140.33	140.33	140.46	140.65
Scrap				
Heavy melting steel, Pittsburgh	$20.00	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	18.75
Heavy melting, steel, Chicago	18.75	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	20.00
Coke				
Connellsville, furnace, ovens	$6.50	$6.50	$6.40	$6.00
Connellsville, foundry, ovens	7.75	7.75	7.50	7.25
Chicago, by-product fdry., del.	12.25	12.25	12.25	12.25

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941 and Feb. 4, 1942. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. Seconds and off-grade products also are covered. Exceptions applying to individual companies are noted in the table.

Semifinished Steel

Gross ton basis except wire rods, skelp.

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00.
(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at $33 gross ton, f.o.b. mill.)

Alloy Steel Ingots: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon; uncropped, $45.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $34.00; Detroit, del. $36; Duluth (bil.) $36.
(Andrews Steel Co., carbon slabs $41; Continental Steel Corp., billets $34, Kokomo, to Acme Steel Co.; Northwestern Steel & Wire Co. $41, Sterling, Ill.; Laclede Steel Co. $34, Alton or Madison, Ill.; Wheeling Steel Corp. $36 base, billets for lend-lease, $34, Portsmouth, O., on slabs on WPB directives.)

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $40. Detroit, del. $42; Duluth, billets only, $42.
(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points; Follansbee Steel Corp., $49.50 f.o.b. Toronto, O.

Open Hearth Shell Steel: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Youngstown, Birmingham, base 1000 tons one size and section: 3-12 in., $52; 12-18 in., excl., $54.00; 18 in. and over, $56. Add $2.00 del. Detroit; $3.00 del. Eastern Mich.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54; del. Detroit $56, Eastern Mich. $57.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $34. (Wheeling Steel Corp. $37 on lend-lease sheet bars, $38 Portsmouth, O., on WPB directives; Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Pt., Youngstown, Coatesville, lb., 1.90c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, Galveston, No. 5—9/32 in., inclusive, per 100 lbs., $2. Do., over 9/32—47/64-in., incl., $2.15.
Worcester add $0.10; Pacific Ports $0.50.

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3": Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, base 20 tons one size, 2.15c; Duluth, base 2.25c; Mahoning Valley 2.22½c; Detroit, del. 2.25c; Eastern Mich. 2.30c; New York del. 2.49c; Phila. del. 2.47c; Gulf Ports, dock 2.52c; Pac. ports, dock 2.80c.
(Calumet Steel Division, Borg Warner Corp., may quote 2.35c, Chicago base, on bars produced in its 8-inch mill.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.)

Hot-Rolled Alloy Bars: Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c; Detroit, del., 2.80c.
(Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	$0.10	4100 (.15-.25 Mo)	0.55
		(.20-.30 Mo)	0.60
2300	1.70	4340	1.70
2500	2.55	4600	1.20
3000	0.50	4800	2.15
3100	0.70	5100	0.35
3200	1.35	5130 or 5152	0.45
3400	3.20	6120 or 6152	0.95
4000	0.45-0.55	6145 or 6150	1.20

*Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.65c; Detroit 2.70c; Toledo 2.80c.
(Keystone Drawn Steel Co. may sell outside its usual market area on Proc. Div., Treasury Dept. contracts at 2.65c, Spring City, Pa., plus freight on hot-rolled bars from Pittsburgh to Spring City. New England Drawn Steel Co. may sell outside New England on WPB directives at 2.65c, Mansfield, Mass., plus freight on hot-rolled bars from Buffalo to Mansfield.)

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.45c; Eastern Mich 3.50c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c; Pacific ports, dock 2.55c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo base 2.15c; Detroit, del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel reinforcing bars 2.33c, f.o.b. mill.)

Iron Bars: Single refined, Pitts. 4.40c, double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, common, 2.15c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.10c; Granite City, base 2.20c; Detroit del. 2.20c; Eastern Mich. 2.25c; Phila. del. 2.27c; New York del., 2.34c; Pacific ports 2.65c.
(Andrews Steel Co. may quote hot-roiled sheets for shipment to Detroit and the Detroit area on the Middletown, O. base.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.15c; Eastern Mich. 3.20c; New York del. 3.39c; Phila. del. 3.37c; Pacific ports 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.50c; Granite City, base 3.60c; New York del. 3.74c; Phila. del. 3.67c; Pacific ports 4.05c.
(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.31c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; Granite City 3.70c; Pacific Ports 4.25c; copper iron 3.90c, pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh 4.25c.

Enameling Sheets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 10 gage, base 2.75c; Granite City, base 2.85c; Detroit del. 2.85c; Eastern Mich. 2.90c; Pacific ports 3.40c.

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 20 gage, base 3.35c; Granite City, base 3.45c; Detroit del. 3.45c; Eastern Mich. 3.50c; Pacific ports 4.00c.

Electrical Sheets, No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.20c	3.95c	3.30c
Armature	3.55c	4.30c	3.65c
Electrical	4.05c	4.80c	4.15c
Motor	4.95c	5.70c	5.05c
Dynamo	5.65c	6.40c	5.75c
Transformer			
72	6.15c	6.90c	....
65	7.15c	7.90c	....
58	7.65c	8.40c	....
52	8.45c	9.20c	....
U.S.S., R.C. Grade 10.10c		.....	....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base, 1 ton and over, 12 inches wide and less 2.10c;.. Detroit del. 2.20c; Eastern Mich. 2.25c; Pacific ports 2.75c. (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)

Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.90c; Eastern Mich. 2.95c; Worcester base 3.00c.

Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Chicago 3.05c; Detroit del. 3.45c; Eastern Mich. 3.50c; Worcester base 3.35c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.

Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb. base box, 0.50 lb. tin, $4.50; 0.75 lb. tin $4.65.

Tin Mill Black Plate, Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c; Pacific ports 4.55c.

Manufacturing Ternes: (Special Coated) Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C., 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16.00; 30-lb. $17.25; 40-lb. $19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.10c; New York, del., 2.29c; Phila., del., 2.15c; St. Louis, 2.34c; Boston, del., 2.42-67c; Pacific ports, 2.65c; Gulf Ports, 2.45c.

(Granite City Steel Co. may quote carbon plates 2.35c, f.o.b. mill. Central Iron & Steel Co. 2.20c, f.o.b. basing points.)

Floor Plates: Pittsburgh, Chicago, 3.35c; Pacific ports, 4.00c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c; Gulf ports 3.95c; Pacific ports 4.15c.

Wrought Iron Plates: Pittsburgh, 3.80c

Shapes

Structural shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del., 2.27c; Phila., del., 2.215c; Pacific ports, 2.75c.

(Phoenix Iron Co., Phoenixville, Pa. may quote carbon steel shapes at 2.35c at established basing points and 2.50c, Phoenixville, for export.)

Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester, $1 for Duluth):

Bright basic, bessemer wire 2.60c
Spring wire 3.20c

Wire Products to the Trade:

Standard and Cement-coated wire nails, and staples, 100-lb. keg, Pittsburgh, Chicago, Birmingham, Cleveland, Duluth $2.55; Pacific ports 3.05c
Annealed fence wire, 100-lb., Pittsburgh, Chicago, Cleveland 3.05c
Galvanized fence wire, 100 lb., Pittsburgh, Chicago, Cleveland 3.40c
Woven fence, 15½ gage and heavier, per base column ..... .67
Barbed wire, 80-rod spool, Pittsburgh, Chicago, Cleveland, Birmingham, column 70; twisted barbless wire, column 70.

Pipe, Tubes

Welded Pipe: Base price in carloads, threaded and coupled, to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
⅛	56	33	¼	24	3½
¼ & ⅜	59	40½	⅜	30	10
½	63½	51	1-1¼	34	16
¾	66½	55	1½	38	18½
1-3	68½	57½	2	37½	18

Lap Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
2	61	49½	1¼	23	3½
2½-3	64	52½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2½, 3½	31½	14½
9-19	64½	52	4	33½	18
11-12	63½	51	4½-8	32½	17
			9-12	28½	12

Boiler Tubes: Net base prices per 100 feet, f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O. D. Sizes	B.W.G.	—Seamless— Hot Rolled	Cold Drawn	—Lap Weld— Steel	Charcoal Iron
1"	13	$ 7.82	$ 9.01	....	....
1¼"	13	9.26	10.67	....	....
1½"	13	10.23	11.72	$ 9.72	$23.71
1¾"	13	11.64	13.42	11.04	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2¼"	12	16.01	18.45	15.16	....
2½"	12	17.54	20.21	16.58	26.57
2¾"	12	18.89	21.42	17.54	29.00
3"	12	19.50	22.48	18.38	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	....

Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, $40.00.

Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $40.00.

*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $28-$30.

Supplies: Track bolts, 4.75c; do. heat treated, 5.00c. Tie plates, $43 gross ton, base.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, base, cents per lb.: Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.

High Speed Tool Steels:

Tung.	Chr.	Van.	Moly.	Pitts. base per lb.
18.00	4	1	...	67.00c
1.5	4	1	8.5	54.00c
	4	2	8	54.00c
5.50	4	1.50	4	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
CHROMIUM NICKEL STEEL					
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	....	....
*316	40.00	44.00	48.00	40.00	48.00
†321	29.00	34.00	41.00	29.29	38.00
‡347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50
STRAIGHT CHROMIUM STEEL					
403	21.50	24.50	29.50	21.25	27.00
**410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
††420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
‡‡430F.	19.50	22.50	29.50	18.75	24.50
440A	24.00	28.50	33.50	23.75	36.50
442	22.50	25.50	32.50	24.00	32.00
443	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00
STAINLESS CLAD STEEL (20%)					
304	.....	§§18.00	19.00	.....	.....

*With 2-3% moly. †With titanium. ‡With columbium. ** Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.

Extras mean additions or deductions from base prices in effect April 16, 1941.

Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price, plus all-rail freight may be charged.

Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price. **Emergency basing point** is the basing point at or near the place of production or origin.

Seconds, maximum prices: flat-rolled rejects 75% of prime prices; wasters 75%, waste-wasters 65%, except plates, which take waster prices; tin plate $2.80 per 100 lbs.; terne plate $2.25; semifinished 85% of primes; other grades limited to new material ceilings.

Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941.

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine

½ x 6 and smaller ..... 65½ off
Do., ⅞ and ⅝ x 6-in. and shorter.. 63½ off
Do., ¾ to 1 x 6-in. and shorter..... 61 off
1⅛ and larger, all lengths ..... 59 off
All diameters, over 6-in. long..... 59 off
Tire bolts ..... 50 off
Step bolts ..... 56 off
Plow bolts ..... 65 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Nuts

Semifinished hex.	U.S.S.	S.A.E.
⅞-inch and less	62	64
⅛-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger	56	..

Hexagon Cap Screws

Upset 1-in., smaller ..... 64 off
Milled 1-in., smaller ..... 60 off

Square Head Set Screws

Upset, 1-in., smaller ..... 71 off
Headless, ¼-in., larger ..... 60 off
No. 10, smaller ..... 70 off

Piling

Pittsburgh, Chicago, Buffalo 2.40c

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

Structural 3.75c
⅞-inch and under ..... 65-5 off
Wrought washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l. .....$2.75-3.00 off

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	*$6.50
Connellsville, foundry	7.50- 8.00
Connellsville prem. fdry.	7.75- 8.10
New River, foundry	8.50- 8.75
Wise county, foundry	7.25- 7.75
Wise county, furnace	6.75- 7.25

By-Product Foundry

Kearny, N. J., ovens	12.15
Chicago, outside delivered	11.50
Chicago, delivered	12.25
Terre Haute, delivered	12.00
Milwaukee, ovens	12.25
New England, delivered	13.75
St. Louis, delivered	†12.25
Birmingham, ovens	8.50
Indianapolis, delivered	12.00
Cincinnati, delivered	11.75
Cleveland, delivered	12.30
Buffalo, delivered	12.50
Detroit, delivered	12.25
Philadelphia, delivered	12.38

*Operators of hand-drawn ovens using trucked coal may charge $7.00, effective Feb. 3, 1943.
†$12.75 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	12.50c
Do., less than car lots	13.25c
Do. tank cars	11.50c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls., to jobbers	8.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$20.20

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941. Exceptions indicated in footnotes. Allocation regulations from WPB Order M-17, expiring Dec. 31, 1942. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

	No. 2 Foundry	Basic*	Bessemer	Malleable
Bethlehem, Pa., base	$25.00	$24.50	$26.00	$25.50
Newark, N. J., del.	26.53	26.03	27.53	27.03
Brooklyn, N. Y., del.	27.50	.....	.....	28.00
Birdsboro, Pa., base	25.00	24.50	26.00	25.50
Birmingham, base	‡20.38	†19.00	.....	.....
Baltimore, del.	25.61	.....	.....	.....
Boston, del.	25.12	.....	.....	.....
Chicago, del.	24.22	.....	.....	.....
Cincinnati, del.	24.06	22.68	.....	.....
Cleveland, del.	24.12	23.24	.....	.....
Newark, N. J., del.	26.15	.....	.....	.....
Philadelphia, del	25.46	24.56	.....	.....
St. Louis, del.	24.12	23.24	.....	.....
Buffalo, base	24.00	23.00	25.00	24.50
Boston, del.	25.50	25.00	26.50	26.00
Rochester, del.	25.53	.....	26.53	26.03
Syracuse, del.	26.08	.....	27.08	26.58
Chicago, base	24.00	23.50	24.50	24.00
Milwaukee, del.	25.10	24.60	25.60	25.10
Muskegon, Mich., del.	27.19	.....	.....	27.19
Cleveland, base	24.00	23.50	24.50	24.00
Akron, Canton, O., del.	25.39	24.89	25.89	25.39
Detroit, base	24.00	23.50	24.50	24.00
Saginaw, Mich., del.	26.31	25.81	26.81	26.31
Duluth, base	24.50	24.00	25.00	24.50
St. Paul, del.	26.63	26.13	27.13	26.63
Erie, Pa., base	24.00	23.50	25.00	24.50
Everett, Mass., base	25.00	24.50	26.00	25.50
Boston, del.	25.50	25.00	26.50	26.00
Granite City, Ill., base	24.00	23.50	24.50	24.00
St. Louis, del.	24.50	24.00	.....	24.50
Hamilton, O., base	24.00	23.50	.....	24.00
Cincinnati, del.	24.44	24.61	.....	25.11
Neville Island, Pa., base	24.00	23.50	24.50	24.00
‡Pittsburgh, del. No. & So. sides	24.69	24.19	25.19	24.69
Provo, Utah, base	22.00	21.50	.....	.....
Sharpsville, Pa., base	24.00	23.50	24.50	24.00
Sparrows Point, Md., base	25.00	24.50	.....	.....
Baltimore, del.	25.99	.....	.....	.....
Steelton, Pa., base	.....	24.50	.....	25.50
Swedeland, Pa., base	25.00	24.50	26.00	25.50
Philadelphia, del.	25.84	25.34	.....	26.34
Toledo, O., base	24.00	23.50	24.50	24.00
Mansfield, O., del.	25.94	25.44	25.44	25.94
Youngstown, O., base	24.00	23.50	24.50	24.00

*Basic silicon grade (1.75-2.25%), add 50c for each 0.25%. †For phosphorus 0.70 and over deduct 38c. ‡Over 0.70 phos. §For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

Note: Add 50 cents per ton for each 0.50% manganese over 1.00%.

High Silicon, Silvery

6.00-6.50 per cent (base)	$29.50		
6.51-7.00	$30.50	9.01- 9.50	$35.50
7.01-7.50	31.50	9.51-10.00	36.50
7.51-8.00	32.50	10.01-10.50	37.50
8.01-8.50	33.50	10.51-11.00	38.50
8.51-9.00	34.50	11.01-11.50	39.50

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton. (For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Charcoal Pig Iron

Northern

Lake Superior Furn. $28.00
Chicago, del. 31.34

Southern

Semi-cold blast, high phos., f.o.b. furnace, Lyles, Tenn. $28.50
Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn. 33.00

Gray Forge

Neville Island, Pa. $23.50
Valley, base 23.50

Low Phosphorus

Basing points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50 base; $30.74, delivered, Philadelphia.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorus Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorus content of 0.70% and over.

Manganese Differentials: Basing point prices subject to an additional charge not to exceed 50 cents a ton for each 0.50% manganese content in excess of 1.0%.

Ceiling Prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Pittsburgh Coke & Iron Co. (Sharpsville, Pa. furnace only) and Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $2 per ton, effective May 20, 1943. Chester, Pa., furnace of Pittsburgh Coke & Iron Co. may exceed basing point prices by $2.25 per ton, effective July 27, 1942.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky. $64.60

First Quality

Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30
New Jersey	56.00
Ohio	43.00

Second Quality

Pa., Ill., Md., Mo., Ky.	46.55
Alabama, Georgia	38.00
New Jersey	49.00
Ohio	36.00

Malleable Bung Brick

All bases $59.85

Silica Brick

Pennsylvania	$51.30
Joliet, E. Chicago	58.90
Birmingham, Ala.	51.30

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$31.00
Wire cut	29.00

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Metallurgical grade, f.o.b. Ill., Ky., net ton, carloads, CaF_2 content, 70% or more, $33; 65 but less than 70%, $32; 60 but less than 65% $31; less than 60% $30. (After Aug. 29 base price any grade $30.)

Ferroalloy Prices

Ferromanganese (standard): 78-82% c.l. gross ton, duty paid, eastern, central and western zones, $135; add $6 for packed c.l., $10 for ton, $10.50 less-ton; f.o.b. cars, New Orleans, $1.70 for each 1%, or fraction contained manganese over 82% or under 78%; delivered Pittsburgh, $140.33. Ferromanganese (low and medium carbon): eastern zone, low carbon, bulk, c.l., 23c, 2000 lb. to c.l., 23.40c; medium, 14.50c and 15.20c; central, low carbon, bulk, c.l., 23.30c, 2000 lb. to c.l., 24.40c; medium, 14.80c and 16.20c; western, low carbon, bulk, c.l., 24.50c, 2000 lb. to c.l., 25.40c; medium, 15.75c and 17.20c; f.o.b. shipping point, freight allowed.

Spiegeleisen: 19-21%, carlots per gross ton, Palmerton, Pa. $36; 16-19%, $35.

Electrolytic Manganese: 99.9% plus, less ton lots, per lb. 37.6 cents.

Chromium Metal: 97% min. chromium, max. .50% carbon, eastern zone, bulk, c.l., 79.50c, 2000 lb. to c.l., 80c; central, 81c and 82.50c; western, 82.25c and 84.75c; f.o.b. shipping point, freight allowed.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, f.o.b. Niagara Falls, N. Y. $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: High carbon, eastern zone, bulk, c.l., 13c, 2000 lb. to c.l., 13.90c; central, add .40c and .65c; western, add 1c and 1.85c —low carbon, eastern, bulk, c.l., max. 0.06% carbon, 23c, 0.10% 22.50c, 0.15% 22c, 0.20% 21.50c, 0.50% 21c, 1.00% 20.50c, 2.00% 19.-50c; 2000 lb. to c.l., 0.06% 24c, 0.10% 23.50c, 0.15% 23c, 0.20% 22.50c, 0.50% 22c, 1.00% 21.50c, 2.00% 20.50c; central, add .4c for bulk, c.l. and .65c for 2000 lb. to c.l.; western, add 1c for bulk, c.l. and 1.85c for 2000 lb. to c.l.; carload packed differential .45c; f.o.b. shipping point, freight allowed. Prices per lb. contained Cr.

Briquets: Ferrochrome, containing exactly 2-lb. Cr., eastern zone, bulk, c.l., 8.25c per lb. of briquets, 2000 to c.l., 8.75c; silicomanganese briquets, containing exactly 2 lb. manganese and ¼ lb. silicon, bulk, c.l., 5.80c, 2000 lb. to c.l., 6.30c; ferrosilicon briquets, approximately 5 lb. and containing exactly 2 lb. of silicon, or weighing approximately 2½ lb. and containing exactly 1 lb. of silicon, bulk, c.l., 3.35c, 2000 lb. to c.l., 3.80c; central, ferrochrome, .3c for c.l. and .5c for 2000 lb. to c.l.; silicomanganese, add .25c for c.l., and 1c for 2000 lb. to c.l.; ferrosilicon, add .15c for c.l. and .40c for 2000 lb. to c.l.; western, ferrochrome, add .70c for c.l. and 2c for 2000 to c.l., silicomanganese, add .55c for c.l. and 2c for 2000 lb. to c.l., ferrosilicon, add .30c for c.l. and .45c for 2000 to c.l.; f.o.b. shipping point, freight allowed.

Ferromolybdenum: 55-75%, per lb. contained molybdenum, f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Eastern zone, 90-95%, bulk, c.l., 11.05c, 2000 lb. to c.l., 12.30c; 80-90%, bulk c.l., 8.90c, 2000 lb. to c.l., 9.95c; 75%, bulk, c.l., 8.05c, 2000 lb. to c.l., 9.05c; 50%, bulk, c.l., 6.65c and 2000 lb. to c.l., 7.85c; central, 90-95%, bulk, c.l., 11.20c, 2000 lb. to c.l., 12.80c; 80-90%, bulk, c.l., 9.05c, 2000 to c.l., 10.45c; 75%, bulk, c.l., 8.20c, 2000 lb. to c.l., 9.65c; 50% bulk, c.l., 7.10c, 2000 lb. to c.l., 9.70c; western, 90-95%, bulk, c.l., 11.65c, 2000 lb. to c.l., 15.60c; 80-90%, bulk, c.l., 9.55c, 2000 lb. to c.l., 13.50c; 75%, bulk, c.l., 8.75c, 2000 to c.l., 13.10c; 50%, bulk, c.l., 7.25c, 2000 to c.l., 8.75c; f.o.b. shipping point, freight allowed. Prices per lb. contained silicon.

Silicon Metal: Min. 97% and max. 1% iron, eastern zone, bulk, c.l., 12.90c, 2000 lb. to c.l., 13.45c; central, 13.20c and 13.90c; western, 13.85c and 16.80c; min. 97% and max. 2% iron, eastern, bulk, c.l., 12.50c, 2000 lb. to c.l., 13.10c; central, 12.80c and 13.35c; western, 13.45c and 16.50c; f.o.b. shipping point, freight allowed. Prices per lb. contained silicon.

Silicomanganese: Max. 1.50 carbon, bulk, c.l., eastern zone, 6.05c, 2000 lb. to c.l., 6.70c; central, add .25c and 1.00c; western, .55c and 2.00c; f.o.b. shipping point, freight allowed; all prices per pound of alloy.

Manganese Metal: 96 to 98% manganese, max. 2% iron, eastern zone, bulk, c.l., 39.60c, 2000 lb. to c.l., 40c; central, 39.85c and 41c; western, 40.15c and 43.05c; 95 to 97% manganese, max. 2.50% iron, eastern, bulk, c.l., 35.60, 2000 c.l., 36c; central, 35.85c and 37c; western, 36.15c and 39.05c; f.o.b. shipping point, freight allowed.

Ferrotungsten: Carlots, per lb. contained tungsten, $1.90.

Tungsten Metal Powder: 98-99%, per lb. any quantity $2.55-2.65.

Ferrotitanium: 40-45%, f.o.b. Niagara Falls, N. Y., per lb. contained titanium: ton lots $1.23; less-ton lots $1.25. Spot up 5 cents per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium: ton lots $1.35; less-ton lots $1.40. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20%, contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $142.50; 3-5% carbon $157.50.

Ferrovanadium: 35-40%, contract basis, per lb. contained vanadium, f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Zirconium Alloys: 12-15%, contract basis, carloads bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot $5 per ton higher.

Zirconium Alloy: 35-40%, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼-cent higher.

Alsifer: (Approx. 20% aluminum, 40% silicon, 40% iron) contract basis, f.o.b. Niagara Falls, N. Y., per lb. 7.50c; ton lots 8.00c. Spot ½-cent higher.

Simanal: (Approx. 20% each silicon, manganese, aluminum) Contract basis, freight allowed, per lb. of alloy; carlots 9.50c; ton lots 10.00c, less ton lots, 10.50c.

Borosil: 3 to 4% boron, 40 to 45% si., $7 lb. cont. Bo., f.o.b. Philo, O.

WAREHOUSE STEEL PRICES

Base delivered price, cents per pound, for delivery within switching limits, subject to established extras.

	Hot rolled bars	Structural shapes	Plates	Floor plates	Hot rolled sheets (10 gage base)	Hot rolled bands (12 gage and heavier)	Hot rolled hoops (14 gage and lighter)	Galvanized flat sheets (24 gage base)	Coldrolled sheets (17 gage base)	Cold finished bars	Cold-rolled strip	NE hot bars 8000 series	NE hot bars 9400 series
Boston	4.044[1]	3.912[1]	3.912[1]	5.727[1]	3.774[1]	4.106[1]	5.106[1]	5.224[14]	4.744[14]	4.144[13]	4.715	7.762[20]	6.062[20]
New York	3.853[1]	3.758[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[13]	4.613[14]	4.103[21]	4.774	.....	.....
Jersey City	3.853[1]	3.747[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[13]	4.613[14]	4.103[21]	4.774	.....	.....
Philadelphia	3.822[1]	3.666[1]	3.605[1]	5.272[1]	3.518[1]	3.922[1]	4.272[1]	5.018[13]	4.872[25]	4.072[21]	4.772	7.566[20]	5.866[20]
Baltimore	3.802[1]	3.759[1]	3.594[1]	5.252[1]	3.394[1]	3.902[1]	4.252[1]	4.894[1]	4.852[25]	4.052[21]	.....	.....	.....
Washington	3.941[1]	3.930[1]	3.796[1]	5.341[1]	3.596[1]	4.041[1]	4.391[1]	5.196[17]	4.841[25]	4.041[21]	.....	.....	.....
Norfolk, Va.	4.065[1]	4.002[1]	3.971[1]	5.465[1]	3.771[1]	4.165[1]	4.515[1]	5.371[17]	4.965[24]	4.165[21]	.....	.....	.....
Bethlehem, Pa.*	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Claymont, Del.*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Coatesville, Pa.*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Buffalo (city)	3.35[1]	3.40[1]	3.65[1]	5.26[1]	3.35[1]	3.819[1]	3.819[1]	4.75[15]	4.40[19]	3.75[21]	4.66	7.35[20]	5.65[20]
Buffalo (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.81[1]	3.81[1]	4.65[15]	4.30[19]	3.65[21]	4.55	7.35[20]	5.65[20]
Pittsburgh (city)	3.35[1]	3.40[1]	3.40[1]	5.00[1]	3.35[1]	3.60[1]	3.60[1]	4.75[13]	4.40[24]	3.75[21]	.....	7.45[20]	5.75[20]
Pittsburgh (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.50[1]	3.50[1]	4.65[13]	4.30[24]	3.65[21]	.....	.....	.....
Cleveland (city)	3.35[1]	3.588[1]	3.40[1]	5.188[1]	3.35[1]	3.60[1]	3.60[1]	4.877[13]	4.40[24]	3.75[21]	4.45	7.556[20]	5.856[20]
Cleveland (country)	3.25[1]	.....	3.30[1]	.....	3.25[1]	3.50[1]	3.50[1]	.....	4.30[24]	3.65[21]	4.35[21]	.....	.....
Detroit	3.450[1]	3.661[1]	3.609[1]	5.281[1]	3.450[1]	3.700[1]	3.700[1]	5.000[13]	4.500[24]	3.800[21]	4.659	7.680[20]	5.980[20]
Omaha (city, delivered)	4.115[1]	4.165[1]	4.165[1]	5.765[1]	3.865[1]	4.215[1]	4.215[1]	5.608[10]	5.443[24]	4.443[21]	.....	.....	.....
Omaha (country, base)	4.015[1]	4.065[1]	4.065[1]	5.665[1]	3.765[1]	4.115[1]	4.115[1]	5.508[10]	.....	.....	.....	.....	.....
Cincinnati	3.611[1]	3.691[1]	3.661[1]	5.291[1]	3.425[1]	3.675[1]	3.675[1]	4.825[10]	4.475[24]	4.011[21]	4.711	6.10	6.20
Youngstown, O.*	.....	.....	.....	.....	.....	.....	.....	4.40[13]	.....	.....	.....	.....	.....
Middletown, O.*	.....	.....	.....	.....	3.25[1]	3.50[1]	3.50[1]	4.65[15]	.....	.....	.....	.....	.....
Chicago (city)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.25[1]	3.60[1]	3.60[1]	5.231[15]	4.20[24]	3.75[21]	4.65	5.75[20]	5.85[20]
Chicago (country)	3.40[1]	3.45[1]	3.45[1]	5.05[1]	3.15[1]	3.50[1]	3.50[1]	4.85[15]	4.10[24]	3.65[21]	4.55	5.75[20]	5.85[20]
Milwaukee	3.637[1]	3.687[1]	3.687[1]	5.287[1]	3.387[1]	3.737[1]	3.737[1]	5.272[13]	4.337[24]	3.887[21]	4.787	5.987[20]	6.087[20]
Indianapolis	3.58[1]	3.63[1]	3.63[1]	5.23[1]	3.518[1]	3.768[1]	3.768[1]	4.918[15]	4.568[24]	3.98[21]	4.78	6.08[20]	6.18[20]
St. Paul	3.76[2]	3.81[2]	3.81[2]	5.41[2]	3.51[2]	3.86[2]	3.86[2]	5.257[15]	4.46[24]	4.361[21]	5.102	6.09[20]	6.19[20]
St. Louis	3.647[1]	3.697[1]	3.697[1]	5.297[1]	3.397[1]	3.747[1]	3.747[1]	5.172[15]	4.347[24]	4.031[21]	4.931	6.131[20]	6.231[20]
Memphis, Tenn.	3.90[5]	3.95[5]	3.95[5]	5.71[5]	3.85[5]	4.10[5]	4.10[5]	5.25[11]	4.66[24]	4.31[21]	.....	.....	.....
Birmingham (city)	3.50[5]	3.55[5]	3.55[5]	5.83[6]	3.45[5]	3.76[5]	3.70[5]	4.75[15]	4.78[24]	4.43[21]	.....	.....	.....
Birmingham (country)	3.40[5]	3.45[5]	3.45[5]	5.83[5]	3.35[5]	3.60[5]	3.60[5]	4.75[15]	4.78[24]	4.43[21]	.....	.....	.....
New Orleans (city)	4.10[4]	3.90[4]	3.90[4]	5.85[4]	3.95[4]	4.20[4]	4.20[4]	5.25[15]	4.95[19]	4.60[21]	5.00	.....	.....
New Orleans (country)	4.00[4]	3.80[4]	3.80[4]	5.75[4]	3.85[4]	4.10[4]	4.10[4]	5.15[15]	4.95[19]	4.60[21]	.....	.....	.....
Houston, Tex.	3.75[3]	4.25[3]	4.25[3]	5.50[3]	3.75[3]	4.30[3]	4.30[3]	5.25[15]	5.45[19]	4.50[25]	.....	.....	.....
Los Angeles	4.35[4]	4.60[4]	4.90[4]	7.15[4]	4.95[4]	4.90[4]	6.70[4]	5.95[15]	7.15[4]	5.70[22]	.....	9.55[20]	8.55[20]
San Francisco (city)	3.95[7]	4.35[7]	4.65[7]	6.35[7]	4.55[7]	4.50[7]	4.50[7]	6.60[15]	7.55[19]	5.55[20]	.....	9.80[9]	8.80[9]
San Francisco (country)	3.85[7]	4.25[7]	4.55[7]	6.25[7]	4.45[7]	4.40[7]	4.40[7]	6.50[15]	7.45[19]	5.45[20]	.....	.....	.....
Tacoma	4.20[6]	4.45[6]	4.75[6]	6.50[6]	4.65[6]	4.25[6]	5.45[6]	5.70[6]	6.63[24]	5.75[20]	.....	.....	.....
Seattle (city)	4.20[6]	4.45[6]	4.75[6]	6.50[6]	4.65[6]	4.35[6]	5.45[6]	5.70[6]	6.63[24]	5.75[20]	.....	8.00[6]	.....

*Basing point cities, with quotations representing mill prices, plus warehouse spread.

NOTE—All prices fixed by Office of Price Administration in amendments Nos. 10 to 16 to Revised Price Schedule No. 49. Deliveries outside above cities computed in accordance with regulations.

BASE QUANTITIES

[1]—400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 3999 pounds; [6]—300 to 1999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds; [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles; [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [19]—one to six bundles; [20]—100 to 749 pounds; [21]—300 to 1999 pounds; [22]—1500 to 39,999 pounds; [24]—1500 to 1999 pounds; [25]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [25]—1000 to 1999 pounds; [24]—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, base.

Ores

Lake Superior Iron Ore

Gross ton, 51½% Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	13.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	7.50-8.00c

Tungsten Ore

Chinese wolframite, per short ton unit, duty paid	$24.00

Chrome Ore

(Equivalent OPA schedules):

Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash. (S/S paying for discharging; dry basis; subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$41.00
48% 3:1	43.50
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80
Brazilian—nominal	
44% 2.5:1 lump	33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio	28.30
48% no ratio	31.00
48% 3:1 lump	43.50
Domestic (seller's nearest rail)	
48% 3:1	52.80
less $7 freight allowance	

Manganese Ore

Including war risk but not duty, cents per gross-ton unit, dry, f.o.b. cars, New Orleans and Mobile; 5 cents higher at Norfolk, Baltimore, Philadelphia, New York; adjustments for analysis variations. (Based on OPA schedules.)

Brazilian, 48%	73.8c
Brazilian, 46%	71.8c
Caucasian, 51%	75.3c
Caucasian, 50%	74.8c
Chilean, 48%	73.8c
Indian, 50%	74.8c
Indian, 48%	73.8c
South African, 48%	73.8c
South African, 46%	71.8c
(Duty Free)	
Cuban, 51%	86.5c
Cuban, 48%	85.0c
Cuban, 45%	82.0c
Philippine, 50%	85.0c
Domestic, 48%, f.o.b. mines	100.0c

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Designation	Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Basic open-hearth Electric furnace Bars per 100 lb.	Billets per G T	Bars per 100 lb.	Billets per G T
	Chemical Composition Limits, Per Cent									
NE 1330	.28-.33	1.60-1.90	.20-.35	.....	.....	.....	$ .10	$2.00	.....	.....
NE 8020	.18-.23	1.00-1.30	.20-.35	.....	.....	.10-.20	.45	9.00	$.95	$19.00
NE 8442	.40-.45	1.30-1.60	.20-.35	.....	.....	.30-.40	.90	18.00	1.40	28.00
NE 8613	.12-.17	.70- .90	.20-.35	.40-.60	.40-.70	.15-.25	.75	15.00	1.25	25.00
NE 8720	.18-.18	.70- .90	.20-.35	.40-.60	.40-.70	.20-.30	.80	16.00	1.30	26.00
NE 9255	.50-.60	.75-1.00	1.80-2.20	.....	.....	.....	.40	8.00	.....	.....
NE 9262	.55-.65	.75-1.00	1.80-2.20	.20-.40	.....	.....	.65	13.00	.....	.....
NE 9415	.13-.18	.80-1.10	.40-.60	.20-.40	.20-.50	.08-.15	.80	16.00	1.30	26.00
NE 9442	.40-.45	1.00-1.30	.40-.60	.20-.40	.20-.50	.08-.15	.85	17.00	1.35	27.00
NE 9537	.35-.40	1.20-1.50	.40-.60	.40-.60	.40-.70	.15-.25	1.20	24.00	1.70	34.00
NE 9630	.28-.33	1.20-1.50	.40-.60	.40-.60	.....	.....	.80	16.00	1.30	26.00
NE 9642	.40-.45	1.30-1.60	.40-.60	.40-.60	.....	.....	.85	17.00	1.35	27.00

Extras are in addition to a base price of 2.70c, per pound on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

MAXIMUM PRICES FIXED BY OPA ON IRON AND STEEL SCRAP

Other than railroad grades quoted on the basis of basing point prices from which shipping point prices and consumers' delivered prices are to be computed. Scrap originating from railroads quoted delivered to consumers' plants located on the line of the railroad from which the material originated. All prices in gross tons. A basing point includes its switching district.

PRICES FOR OTHER THAN RAILROAD SCRAP

					ELECTRIC FURNACE, ACID OPEN-HEARTH AND FOUNDRY GRADES									
					Low Phos. Grades									
	OPEN HEARTH GRADES*	Mixed Bor., Turn., Machine Turnings	Cast Iron Borings	Shoveling Turnings	Billet, Bloom Forge Crops	Bar Crops and smaller; Punchings, Plate	Heavy Structural, Plate 3 ft. and less	Heavy Structural, Plate 2 ft. and less	Heavy Structural, Plate 1 ft. and less	Foundry Steel 2 ft. and less	Foundry Steel 1 ft. and less	Alloy-Free Low Phos. & Sulphur Turnings	First Cut Heavy Axle & Forge Turnings	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Johnstown, Midland, Monessen, Sharon, Steubenville, Weirton, Canton, Youngstown, Warren	$20.00	$15.00	$16.00	$17.00	$25.00	$22.50	$21.50	$22.00	$22.50	$21.50	$22.00	$18.00	$19.50	$21.00
Claymont, Coatesville, Harrisburg, Conshohocken, Phoenixville	18.75	13.75	14.75	15.75	23.75	21.25	20.25	20.75	21.25	20.25	20.75	16.75	18.25	19.75
Bethlehem	18.25	13.25	14.25	15.25	23.25	20.75	19.75	20.25	20.75	19.75	20.25	16.25	17.75	19.25
Buffalo	19.25	14.25	15.25	16.25	24.25	21.75	20.75	21.25	21.75	20.75	21.25	17.25	18.75	20.25
Cleveland, Middletown, Cincinnati, Portsmouth, Ashland	19.50	14.50	15.50	16.50	24.50	22.00	21.00	21.50	22.00	21.00	21.50	17.50	19.00	20.50
Detroit	17.85	12.85	13.85	14.85	22.85	20.35	19.35	19.85	20.35	19.35	19.85	15.85	17.35	18.85
Toledo	†15.35	12.85	13.85	14.85										
Chicago	18.75	13.75	14.75	15.75	23.75	21.25	20.25	20.75	21.25	20.25	20.75	16.75	18.25	19.75
Kokomo	18.25	13.25	14.25	15.25	23.25	20.75	19.75	20.25	20.75	19.75	20.25	16.25	17.75	19.25
Duluth	18.00	13.00	14.00	15.00	23.00	20.50	19.50	20.00	20.50	19.50	20.00	16.00	17.50	19.00
St. Louis	17.50	12.50	13.50	14.50	22.50	20.00	19.00	19.50	20.00	19.00	19.50	15.50	17.00	18.50
Birmingham, Atlanta, Alabama City, Los Angeles, San Francisco, Pittsburg, Calif.	17.00	12.00	13.00	14.00	22.00	19.50	18.50	19.00	19.50	18.50	19.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	11.50	12.50	13.50	21.50	19.00	18.00	18.50	19.00	18.00	18.50	14.50	16.00	17.50
Seattle	14.50	9.50	10.50	11.50	19.50	17.00	16.00	16.50	17.00	16.00	16.50	12.50	14.00	15.50

RAILROAD SCRAP

	Heavy Melting Steel	Scrap Rails	Rails for Rolling	Scrap Rails 3 ft. and under	Scrap Rails 2 ft. and under	Scrap Rails 18 in. and under
Pittsburgh, Wheeling, Steubenville, Sharon, Youngstown, Canton	$21.00	$22.00	$23.50	$24.00	$24.25	$24.50
Philadelphia, Wilmington, Sparrows Point	19.75	20.75	22.25	22.75	23.00	23.25
Cleveland, Cincinnati, Middletown, Ashland, Portsmouth	20.50	21.50	23.00	23.50	23.75	24.00
Chicago	19.75	20.75	22.25	22.75	23.00	23.25
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Kokomo	19.25	20.25	21.75	22.25	22.50	22.75
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00
Birmingham	18.00	19.00	20.50	21.00	21.25	21.50
Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Seattle	15.50	16.50	18.00	18.50	18.75	19.00

CAST IRON SCRAP OTHER THAN RAILROAD

(Shipping point prices in gross tons)

	Group A	Group B	Group C
No. 1 Cupola Cast	$18.00	$19.00	$20.00
No. 1 Machinery Cast, Drop Broken, 150 lbs. & Under	18.00	19.00	20.00
Clean Auto Cast	18.00	19.00	20.00
Stove Plate	17.00	18.00	19.00
Unstripped Motor Blocks	15.50	16.50	17.50
Heavy Breakable Cast	15.50	16.50	17.50
Charging Box Size Cast	17.00	18.00	19.00
Miscellaneous Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.
Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.
Group C includes states not named in groups A and B, plus Kansas City, Kans.-Mo.

*Open Hearth Grades refer to No. 1 heavy melting steel, No. 1 hydraulic compressed black sheet scrap, No. 2 heavy melting steel, dealers' No. 1 bundles, dealers' No. 2 bundles and No. 1 busheling. No. 1 chem. borings, 1 per cent oil, $1 under, No. 2, 1.5 per cent oil, $2 under heavy melting steel. No. 3 bundles, $2 under No. 1 heavy melting; cast steel, $2.50 over, No. 2 busheling, $2.50 under No. 1 heavy melting steel, auto springs, crankshafts, $1 over No. 1 heavy melting. †Toledo open-hearth grades cover only No. 2 busheling.

A basing point includes the switching district of the city named. The Pittsburgh basing point includes the switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport, Pa. Cincinnati includes Newport, Ky. St. Louis basing point includes Granite City, East St. Louis and Madison, Ill. San Francisco includes South San Francisco, Niles and Oakland, Calif. Chicago includes Gary, Ind. Claymont, Del., includes Chester, Pa.

Inferior Grades: Maximum prices of inferior grades shall continue to bear the same differential below the corresponding listed grades as existed from Sept. 1, 1940, to Jan. 31, 1941. No premium allowed on grades considered superior, unless approved by OPA. Addition of special preparation charges prohibited. Purchase of electric furnace or foundry grades for open hearth or blast furnace use permitted only at no more than price for corresponding open hearth grade. Exceptions: Low phos. billet, bloom and forge crops and electric furnace bundles may exceed open hearth price, and electric furnace bundles may exceed blast furnace price, if material is delivered to the consumer direct from the original industrial producer.

Commissions: No commission is payable except by a consumer to a broker for services rendered, the commission not to exceed 50 cents per gross ton. No commission is payable unless: The broker guarantees the quality and delivery of an agreed tonnage the scrap is purchased at a price no higher than the maximum allowed; the broker sells the scrap to the consumer at the same price at which he purchased it; the broker does not split the commission with the seller of the scrap, with another broker or sub-broker, or with the consumer. Commissions must be shown as separate item on invoice.

Maximum Shipping Point Price: Where shipment to consumer is by rail, vessel or combination of both, scrap is at its shipping point when it has been placed f.o.b. railroad car or f.a.s. vessel. In such cases, maximum shipping point prices are: (1) For shipping points located within a basing point, the price listed in the above table for scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point; and (2) for shipping points located outside a basing point, the price in the above table for scrap at the most favorable basing point, minus the lowest transportation charge by rail, water or combination thereof. When vessel movement is involved, dock charges shall be 50 cents at Memphis, $1 at Great Lakes ports, $1.25 at New England ports, 75 cents elsewhere. New England shipping point prices computed on most favorable basing point prices; maximum transportation charge on scrap from New England, $6.65 per ton.

Scrap shipped by motor vehicle is at its shipping point when loaded. For shipping points within basing points, maximum is price listed in table minus lowest switching charge. When outside basing point, maximum is price at most favorable basing point minus lowest established charge when hauled by common carrier. When hauled by seller charges are based on carload rate for rail shipment, minimum $1.00 per ton.

Maximum Delivered Prices: Determined by adding established transportation charges to shipping point price, not to exceed by more than $1 (plus freight rate increase March 18, 1942) the prices listed in the table for the nearest basing point. Certain exceptions specified in Revised Price Schedule No. 4 (Amendment 1) apply to St. Louis district consumers, to WPB allocations, to water shipments from Duluth or Superior, Wis., to shipments of billets, blooms and forge crops from Pittsburgh and to shipments of electric and foundry grades from Michigan; to shipments of turnings to ferroalloy producers and of borings to chemical users. Delivered prices of scrap shipped under WPB allocations may exceed prices at nearest basing point by more than $1, if most economical transportation is used.

Unprepared Scrap: Above prices are for prepared scrap. Maximum prices for unprepared scrap are $3.50 less; (material from which Nos. 1, 2 and 3 bundles made is $4 less) than for the corresponding grades of prepared scrap, except for heavy breakable cast. In no case shall electric furnace and foundry grades be used as the "corresponding grades of prepared scrap."

Remote Scrap: Consists of all grades, except railroad scrap, in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon, Washington, Louisiana, Utah, Arkansas, Nebraska, Kansas. Delivered price may exceed by not more than $7 the price at the basing point nearest consumer's plant, provided sworn details furnished OPA. Permission required to exceed by more than $7 the nearest basing point price. Colorado is remote for Colorado consumers only.

NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers' in carlots 12.00c, Del. Conn., less carlots 12.12½, refinery; dealers may add ⅛c for 5000 lbs. to carload; 1000-4999 lbs. 1c; 500-999 1½c; 0-499 2c. Casting, 11.75c, refinery for 20,000 lbs., or more, 12.00c less than 20,000 lbs.

Brass Ingot: Carlot prices, including 25 cents per hundred freight allowance; add ¼c for less than 20 tons; 85-5-5-5 (No. 115) 12.25c; 88-10-2 (No. 215) 16.50c; 80-10-10 (No. 305) 14.25c; Navy G (No. 225) 16.75c; Navy M (No. 245) 14.75c; No. 1 yellow (No. 405) 10.00c; manganese bronze (No. 420) 12.75c.

Zinc: Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis, for carlots. For 20,000 lbs. to carlots add 0.15c; 10,000-20,000 0.25c; 2000-10,000 0.40c; under 2000 0.50c.

Lead: Common 6.35c, corroding or chemical, 6.40c, E. St. Louis for carloads; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey, New York State, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester-Springfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lbs. and over; add ½c 2000-9999 lbs.; 1c less than 2000 lbs.

Secondary Aluminum: All grades 14.00c per lb. except as follows: Low-grade piston alloy (No. 122 type) 13.50c; No. 12 foundry alloy (No. 2 grade) 13.50c; chemical warfare service ingot (92½% plus) 13.50c; steel deoxidizers in notchbars, granulated or shot, Grade 1 (95-97½%) 13.75c, Grade 2 (92-95%) 13.50c, Grade 3 (90-92%) 13.00c, Grade 4 (85-90%) 12.50c; any other ingot containing over 1% iron, except PM 754 and hardeners, 13.50c. Above prices for 30,000 lb. or more; add ½c 10,000-30,000 lb.; ½c 2000-10,000 lbs.; 1c less than 1000 lbs. Prices include freight at carload rate up to 75 cents per hundred.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lbs.) 20.50c lb.; add 1c for special shapes and sizes, including 3-lb. ingot and 12-lb. round ingot; incendiary bomb alloy 23.40c, 50-50 magnesium-aluminum 23.75c, ASTM B80-41T No. 11 25.00c, ASTM B94-40T No. 13 25.00c, all others 23.00c. Prices for 100 lbs. or more; for 25-100 lbs. add 10c; for less than 25 lbs. 20c; incendiary bomb alloy f.o.b. plant any quantity; carload freight rate allowed all others for 500 lbs. or more.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lbs., 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.75-99.79% incl. 51.62½c; Grade C, Cornish refined 51.62½c; Grade D, 99.0-99.74% incl. 51.12½c; Grade E, below 99%, 51.00c.

Antimony: American, bulk, carlots, f.o.b. Laredo, Tex., 99.0-99.8% grade 14.50c, 99.8% and over (arsenic 0.05% max.; no other impurity to exceed 0.1% 15.00c. Add ¼c for less-carlots to 10,000 lbs.; ½c for 9999-224 lbs.; 2c for 223 lbs. and less.

Nickel: Electrolytic cathodes, 99.5%, f.o.b. refinery 35.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c; Monel shot 28.00c.

Mercury: Prices per 76-lb. flask f.o.b. point of shipment or entry. Domestic produced in Calif., Oreg., Wash., Idaho, Nev., Ariz. $191; produced in Texas, Ark. $193. Foreign, produced in Mexico, duty paid, $193.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be., $15 lb. contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks and all other "regular" straight or flat forms 90.00c lb., del.; anodes, balls, discs and all other special or patented shapes 95.00c lb. del.

Cobalt: 97-99%, $2.11 lb.; 100 lbs. or more on contract, $1.50 lb.

Indium: 99.5%, $10 per troy ounce.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, N. Y. 44.75c per ounce.

Platinum: $36 per ounce.

Iridium: $165 per troy ounce.

Palladium: $24 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 12.00c, Conn., for copper. Freight prepaid on 100 lbs. or more.)

Sheet: Copper 20.87c; yellow brass 19.48c; commercial bronze, 90% 21.07c, 95% 21.28c; red brass, 80% 20.15c, 85% 20.36c; phosphor bronze, Grades A, B 5% 36.25c; Everdur, Herculoy, Duronze or equiv. 26.00c; naval brass 24.50c; manganese bronze 28.00c; Muntz metal 22.75c; nickel silver 5% 26.50c.

Rods: Copper, hot-rolled 17.37c, cold-rolled 18.37c; yellow brass 15.61c; commercial bronze 90% 21.32c, 95% 21.53c; red brass 80% 20.40c, 85% 20.61c; phosphor bronze Grade A, B 5% 36.50c; Everdur, Herculoy, Duronze or equiv. 25.50c; Naval brass 19.12c; manganese bronze 22.50c; Muntz metal 18.87c; nickel silver 5% 28.75c.

Seamless Tubing: Copper 21.37c; yellow brass 22.23c; commercial bronze 90% 23.47c; red brass 80% 22.80c, 85% 23.01c.

Extruded Shapes: Copper 20.87c; architectural bronze 19.12c; manganese bronze 24.00c, Muntz metal 20.12c; Naval brass 20.37c.

Angles and Channels: Yellow brass 27.98c; commercial bronze 90% 29.57c, 95% 29.78c; red brass 80% 28.65c, 85% 28.86c.

Copper Wire: Bare, soft, f.o.b. Eastern mills, carlots 15.37½c, less-carlots 15.87½c; weatherproof, f.o.b. Eastern mills, carlots 17.60c, less-carlots 17.50c; magnet, delivered, carlots 17.50c, 15,000 lbs. or more 17.75c, less carlots 18.25c.

Aluminum Sheets and Circles: 2s and 3s, flat, mill finish, base 30,000 lbs. or more; del.; sheet widths as indicated; circle diameters 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	8"-24"	25.60c	29.20c

Lead Products: Prices to jobbers; full sheets 9.50c; cut sheets 9.75c; pipe 8.15c, New York; 8.50c Philadelphia, Baltimore, Rochester and Buffalo; 8.75c, Chicago, Cleveland, Worcester, Boston.

Zinc Products: Sheet f.o.b. mill, 13.15c; 36,000 lbs. and over deduct 7%. Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2% 9000 lbs. 3%, 16,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

Plating Materials

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c.

Copper Anodes: Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

Copper Carbonate: 52-54% metallic cu; 250 lb. barrels 20.50c.

Copper Cyanide: 70-71% cu, 100-lb. kegs or bbls. 34.00c f.o.b. Niagara Falls.

Sodium Cyanide: 96%, 200-lb. drums 15.00c; 10,000-lb. lots 13.00c f.o.b. Niagara Falls.

Nickel Anodes: 500-2999 lb. lots; cast and rolled carbonized 47.00c; rolled, depolarized 48.00c.

Nickel Chloride: 100-lb. kegs or 275-lb. bbls. 18.00c lb., del.

Tin Anodes: 1000 lbs. and over 58.50c, del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

Tin Crystals: 400 lb. bbls. 39.00c f.o.b. Grasselli, N. J.; 100-lb. kegs 39.50c.

Sodium Stannate: 100 or 300-lb. drums 36.50c, del.; ton lots 33.50c.

Zinc Cyanide: 100-lb. kegs or bbls. 33.00c, f.o.b. Niagara Falls.

Scrap Metals

Brass Mill Allowances: Prices for less than 15,000 lbs. f.o.b. shipping point. Add ⅝c for 15,000-40,000 lbs.; 1c for 40,000 lbs. or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	10.250	10.250	9.500
Tinned Copper	9.625	9.625	9.375
Yellow Brass	8.625	8.375	7.875
Commercial bronze 90%	9.375	9.125	8.625
95%	9.500	9.250	8.750
Red Brass, 85%	9.125	8.875	8.375
Red Brass, 80%	9.125	8.875	8.375
Muntz metal	8.000	7.750	7.250
Nickel Sil., 5%	9.250	9.000	4.625
Phos. br., A. B. 5%	11.00	10.750	9.750
Herculoy, Everdur or equivalent	10.250	10.000	9.250
Naval brass	8.250	8.000	7.500
Mang. bronze	8.250	8.000	7.500

Other than Brass Mill Scrap: prices apply on material not meeting brass mill specifications and are f.o.b. shipping point; add ⅝c for shipment of 60,000 lbs. of one group and ½c for 20,000 lbs. of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 9.75c; No. 2 copper wire and mixed heavy copper, copper tuyeres 8.75c.

(Group 2) soft red brass and borings, aluminum bronze 9.00c; copper-nickel and borings 9.25c; car boxes, cocks and faucets 7.75c; bell metal 15.50c; babbitt-lined brass bushings 13.00c.

(Group 3) zincy bronze borings, Admiralty condenser tubes, brass pipe 8.00c; Muntz metal condenser tubes 7.50c; yellow brass 6.25c; manganese bronze (lead 0.00%-0.40%) 7.25c, (lead 0.41%-1.0%) 6.25c; manganese bronze borings (lead 0.00-0.40%) 6.50c, (lead 0.41-1.00%) 5.50c.

Aluminum Scrap: Prices f.o.b. point of shipment, respectively for lots of less than 1000 lbs.; 1000-20,000 lbs. and 20,000 lbs. or more, plant scrap only. Segregated solids: 2-type alloys (2S, 3S, 17S, 18S, 24S, 32S, 52S) 9.00c, 10.00c, 10.50c; All other high grade alloys 8.50c, 9.50c, 10.00c; low grade alloys 8.00c, 9.00c, 9.50c. Segregated borings and turnings: Wrought alloys (17S, 18S, 32S, 52S) 7.50c, 8.50c, 9.00c; all other high grade alloys 7.00c, 8.00c, 8.50c; low grade alloys 6.50c, 7.50c, 8.00c. Mixed plant scrap, all solids, 7.50c, 8.50c, 9.00c; borings and turnings 5.50c, 6.50c, 7.00c.

Lead Scrap: Prices f.o.b. point of shipment. For soft and hard lead, including cable lead, deduct 0.55c from basing point prices for refined metal.

Zinc Scrap: New clippings, old zinc 7.25c f.ob. point of shipment; add ¼-cent for 10,000 lbs. or more. New die-cast scrap, radiator grilles 4.95c; add ½c 20,000 or more. Unsweated zinc dross, die cast slab 5.80c any quantity.

Nickel, Monel Scrap: Prices f.o.b. point of shipment; add ½c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ⅛% copper 26.00c; 90-98% nickel, 26.00c per lb. nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb. contained nickel, plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clipping 20.00c; soldered sheet 18.00c.

Sheets, Strip . . .

Sheet & Strip Prices, Page 140

After several weeks of brisk activity, particularly through July, and with deliveries now far extended, many sheet sellers report an easing in demand. Navy and maritime orders for ship construction have declined, although good business is still coming out from the War Department and also from the Office of Civilian Supply. Some sellers claim that orders from the latter claimant agency are, generally speaking, more extended than from many of the others. Both Army and Navy ordnance requirements, such as bomb components, land mines and pontoons are at least being sustained.

January now appears to be the best that can be done on cold-rolled sheets, with some mills practically booked up for entire first quarter. In general December appears to be the earliest that can be done on hot-rolled sheets. Some gaps appear from time to time but they are promptly filled.

Sheet sellers in the New York area claim there have been no recent important cancellations as a result of cutbacks due to revisions in the war program. Most of these cancellations fell in June, with some noted in July.

Galvanized sheet buying has fallen off appreciably during the past fortnight. This is ascribed primarily to heavy buying in July under the increased jobber directives announced at that time. Buying of galvanized sheets by jobbers for September, the first month to be affected by this regulation, was heavy, and as a result it is believed that most distributors will receive enough galvanized in that month to last them for some time, particularly as there has been no easing in limitation on their use. However, most sellers are booked up to November on that grade.

Demand is maintained, with new inquiries in New England for fragmentation bombs and anti-tank mines; for the former long ternes may be used in fabrication. Drum stock continues among the tightest items while galvanized, except for ships, is the easiest. Portsmouth, N. H., navy yard has placed a substantial tonnage, including cold-rolled.

To bring inventories into line with CMP objectives, deferments on shipments from third to fourth quarter are requested by some consumers of narrow cold strip. Most mills, over-scheduled and some sold up to directive quotas, including alloys, to February, welcome this release and are moving some tonnage forward for improved delivery. There have been few outright cancellations. Another factor has been late delivery of some second quarter tonnage, which tends to ease third quarter pressure. Some schedules cut back on machine gun belt link steel have been restored, but not on clips. Some voluntary deferments have also been requested by users in the aircraft industry. Annealing continues to be the choke point in production with new bookings in excess of shipments. Delivery schedules on hot strip are well maintained.

Cancellations, deferments and cutbacks affecting some tonnage for the fabrication of machine gun belt links are confined mostly to one smaller calibre. Shops making this calibre, in cancelling, are forcing some revision of cold-rolling schedules at mills producing this steel. Actually, directives have been increased for larger calibre links, including the .50 calibre belts.

Bars . . .

Bar Prices, Page 140

An unusual situation prevails with regard to bar shipments. Not only are carbon bar deliveries being scheduled farther ahead than in considerable time, but they are much tighter than those quoted on hot alloy bars. Normally the situation in this latter respect is reversed.

Most sellers of hot carbon bars are now virtually booked up over the remainder of the year, on small sizes as well as large, and have substantial order backlogs for shipment during first quarter. On large rounds and flats producers generally have little to offer before February. On hot alloy bars, however, consumers have little difficulty getting shipments in November and in some cases can still pick up tonnage for October.

This is attributed in part to increase in alloy bar capacity, which is now coming in, with still more, especially in the Chicago district, scheduled to become active late in the fall. However, leading bar sellers assert that hot alloy bar demand is simply not coming out in the volume of some time ago. They ascribe it in part to former difficulties in getting hot alloy steel and to subsequent substitutions where possible.

Nevertheless, sellers assert the answer to the present lag in hot alloy bar demand still is not clear to them, and they wonder if suddenly there will not be a spurt, due possibly in a measure to the

STRONG-HEAT

Annealing . . IN THE STRONG MANNER

Users of Strong steel castings are keenly aware of how much they gain in the elimination of internal stresses by the Strong heat-treating and annealing processes. The pit annealing furnace shown above is 15 feet wide by 19 feet long—amply large to heat-treat and anneal the largest of Strong-cast castings. It is oil fired and controlled by recording pyrometer.

Wherever it is desirable, Strong double anneals its castings for extra protection. Strong also uses a car type annealing furnace, oil fired with heat recorder control. Strong can tell a host of vital facts about heat-treating every steel casting buyer should know. Just ask for them.

STRONG STEEL FOUNDRY COMPANY, BUFFALO, N. Y.

STRONG

TENSILE STRENGTH · ELONGATION

difficulty consumers are now beginning to have in getting carbon steel, and to some reason which they cannot quite analyze at the moment.

Cold alloy bar shipments are more extended than hot bar deliveries, owing to extra processing. Not much of this tonnage is being offered for shipment over the remainder of the year, and where special treatment beyond the cold drawing is required, little is available until well into first quarter.

The situation in cold-drawn carbon bars is relatively not as tight, compared with hot carbon bars, as had been the case until recently. Some cold-drawn carbon tonnage is still to be had in November, although admittedly, most processors have little left for shipment this year. Over-all demand is not quite as brisk. There has been a further falling off in orders from machine tool builders, and there is less pressure for shell tonnage, except for machine gun bullets. Demand for this small ammunition appears as heavy as ever, and is drawing largely on bessemer.

Such major outlets as aircraft and ships account for a sustained tonnage, at least along the eastern seaboard, and as a result the letup has not been particularly marked. Also, despite some recent cancellations for Russia, Lend-Lease requirements still run heavy.

Plates . . .

Plate Prices, Page 141

Steel plate production in July totaled 1,089,677 tons, compared with 1,049,360 tons in June and 1,124,118 tons in July, 1942, the Iron and Steel Division of the War Production Board reports.

Increased emphasis on the Navy, barge-building, freight car and locomotive programs can hardly affect plate producers, who for many months have been working at capacity. Changes in specifications will not cause any great difficulty in rolling schedules. Orders now on books assure capacity operations until the end of the year, although these orders may be changed slightly by government orders. Tonnage for the new third quarter freight car program has been allocated.

Strip mill plates in adequate supply will be provided for the new so-called third quarter freight car program. However, there appears to be a shortage of bars and shapes with a result that construction of the equipment may be held up far more than originally anticipated. Of the 5500 cars or so involved in this program, some trade interests doubt if more than 20 per cent at most will be turned out in this quarter.

Plate producers generally are booked solidly over the remainder of the year, with schedules apparently including space in fourth quarter for such tonnage as may eventually be specified for the car program. Most producers have substantial order backlogs for shipment in first quarter, with some having tonnage on order for delivery through entire first half.

With mills scheduled into March in some instances, demand for plates in New England is broadening for shipbuilding barges and pontoons, notably the latter, for which another large program is developing. Contracts for sub-assemblies are numerous. Shipyard inventories are heavy, but not too large, in view of the stepped-up assembly schedules; in completing a British contract, one large yard is short 60 tons per ship for the remainder of Liberty vessels on contract, which will be made up by allocation of a few hundred tons additional for the first units to go on keels.

The heavy demand for plates is pinching warehouse supplies, with deliveries to jobbers more extended than other products covered by warehouse directives.

Pipe . . .

Pipe Prices, Page 141

A little third quarter capacity is still available for butt-weld pipe; however, no more lap-weld is being offered before October and some producers have little capacity left in that month. The situation in seamless is comparable to lap-weld. In mechanical and boiler tubing the situation generally is much tighter, with deliveries extended several months in some cases.

Meanwhile, jobbers are well supplied on merchant pipe. Demand for war construction has tapered and civic construction requirements have long since been negligible, due to wartime limitations. Not even the utilities are requiring tonnage other than what is necessary for maintenance and repairs. Some sizable post-war housing projects are on the planning boards, pointing to a spurt in that direction eventually.

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Structural Shapes . . .

Structural Shape Prices, Page 141

Contracts for 30 sub-assemblies, including bulwarks, hatch end beams, shaft tunnels, hatch covers, bearing foundations, mast houses, bridge bulwarks, longitudinal girders, miscellaneous machine flats, steering gear foundations, tank foundations, life rafts, storage compass platforms, telescope masts and hydrogen bottle storage have been let by a Portland, Me., shipyard for completion of its Liberty ship program by the end of the year. This work is widely spread among New England fabricating shops, one of which, Grossier & Shlager, Somerville, Mass., is assembling 39 knocked down 102-foot oil barges which are to be packed for shipment abroad.

Other sub-contracts include tank foundations and gun platforms. New England yards are sub-letting heavily and most shops are well filled with miscellaneous work. Pontoons also account for substantial tonnages of straightened, machined and punched angles; although but 45 pounds are required per unit, one fabricator of welded pontoons has taken 10,000 tons and another large program is under way.

Demand is concentrated in shipyard sizes and under, with September delivery on plain material possible with some mills; 80 to 85 per cent of current rollings are for ships or affiliated programs. Integrated fabricating shops in some cases need work beyond September.

Pig Iron . . .

Pig Iron Prices, Page 142

Supplies of both steelmaking and foundry pig iron generally are comfortable in the Pittsburgh district, although there are spots where inventories still are a little short, due to effects of coal-strike shutdowns. These are expected to be built up to normal within the next eight to twelve weeks. Some southern iron now is moving into this district. It is suggested that some nonwar industries, principally sanitary ware manufacturers, soon may be allowed some iron. Most of this probably would come from the South. An impediment to this proposal is seen in difficulty of obtaining accessory materials, fittings, enameling facilities, etc.

Anticipated closing down of a considerable number of blast furnaces for relining this summer has not yet occurred. A number are scheduled to go down later, but barring unforeseen breakdowns repair jobs should be accomplished in record time. Carnegie-Illinois Steel Corp.'s Ohio No. 3 stack was blown out Aug. 9 for relining.

Buffalo pig iron producers report a marked decrease in buying by foundries in New York state, in some instances attributed to shrinkage in orders. Other melters feel the pinch in manpower.

Applications for September pig iron in the New York district has shown a drop in the experience of some leading sellers. This is in line with a decline in the melt over the past few months. August consumption may be a shade higher than July, and if so this will be the first increase in at least three months as far as that district is concerned.

Not only is highly rated casting business becoming more difficult for foundries to obtain, but in some instances plants are having difficulty getting men when they are fortunate enough to book an attractive order. This is particularly noticeable in Northern New Jersey, where shipyards have drawn heavily upon employes from other industries, including foundries.

With most consumers melting near capacity, demand for basic and malleable pig iron in New England is heavy and sustained. Allocation of 10,000 tons per month of basic to the largest steelworks consumer in the area, which has been given one producer in recent months, may be divided among two or more in the future with the likelihood of some of this tonnage going to the district furnace. The decline in gray iron foundry demand appears to have leveled off, but without any upturn from the slack of recent months. Most gray iron foundry requirements are allocated to the Everett furnace at the $2 premium price.

Warehouse . . .

Warehouse Prices, Page 143

Warehouses are able to maintain a much better balance than several weeks ago, due to appreciably heavier receipts from mills. However, the situation still leaves much to be desired, as it is difficult to build up inventories, which were seriously depleted. Demand has eased slightly. Recently announced changes in the war production program have as yet had little effect on the type of products being moved.

Buying of commercial grades of alloys has slackened slightly in New England with overall demand for warehouse steel

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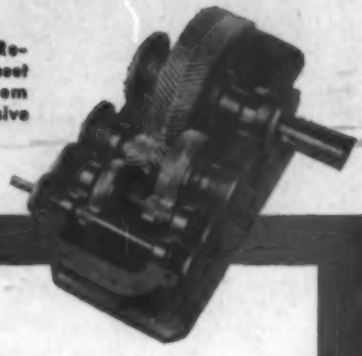

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brisk. Alloy replacements, including NE grades, have been somewhat heavier, which, coupled with lower demand, has balanced inventories to a better degree. Demand for sheets is active with replacements lighter, fill-in shipyard demand accounting for substantial tonnage, including galvanized, which lags in other directions. Shipyards and aircraft engine builders, including scores of subcontractors, are leading jobber customers.

Scrap . . .

Scrap Prices, Page 144

Apprehension over scrap supply late in the year continues to trouble dealers and consumers in the St. Louis district. Owing to cutbacks in some plants producing war goods, output of industrial scrap has declined over the past two months. Commercial yards are fairly well supplied but lack manpower to process their stocks. Little country scrap is expected until after harvest.

Some dealers in the Buffalo district are restricting purchases until present yard stocks have been reduced, which is slow on account of insufficient labor. Movement from the eastern seaboard has been resumed by way of the barge canal.

Mills in the Pittsburgh area again are inquiring for scrap after a considerable period of indifference, leading to the belief they fear a shortage later in the year. However, stocks in dealers' yards are exhausted and new material is extremely slow in coming in. New blast furnace capacity soon to be blown in had been counted on by producers to supply sufficient metallics. Reduction in expected shipments of iron ore have altered this view to some extent.

Production of plant and shipyard scrap in New England is maintained and the heavier open-hearth material is readily absorbed, some by allocation to outside points, but disposal of mixed alloy turnings is difficult and some consumers of low phos are well supplied for the moment. Volume of material reaching dealers' yards continues light, but labor shortages are such as to make preparation of even this tonnage a problem. Cast scrap demand in charging box sizes for steel works is fair, but foundry demand is largely from Pennsylvania. The supply of specialties in the northeast area is small, notably from railroads.

MAYBE IT'S LOADED

Suppliers of scrap steel and iron to Bethlehem Steel Co. have been cautioned by the company's purchasing division to be on the watch against inclusion in scrap shipments of "loaded shells, bombs or other explosives."

"Large quantities of steel and iron scrap are being shipped from shell-loading plants, arsenals proving grounds and similar establishments", the letter of caution states. "This company's scrap inspectors have been cautioned to be on the alert for such hazards but it obviously is not feasible for them to inspect every piece of scrap in every car. Unless vigilance is exercised by both producers and dealers, scrap containing explosives might escape notice and, when charged into a furnace, cause serious or fatal injuries and loss of steel production."

A further hazard is anticipated from so-called warfront scrap which may be arriving shortly.

Pacific Coast . . .

Seattle—Pacific Northwest war industries are outlining plans whereby operations can be continued after the war. Following Boeing's recent announcement that various peace-time necessities will be produced, in addition to airplanes, R. D. Reynolds Jr., vice president of Reynolds Metal Co., states that plans are in the making for maintaining production at the Longview, Wash., plant when war pressure for aluminum is over.

War orders give local rolling mills a continued backlog which will carry to the end of the year. Reinforcing steel is of secondary consideration as not much of this item is required, although Northwest Steel Rolling Mills, Seattle, is fabricating 2500 tons for Tacoma's second Nisqually power project. Merchant bars are in strong demand, mostly from

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shipyards and subsidiary plants.

Pipe agencies report fairly complete stocks from which small tonnages are moving. Major projects are confined to government work, which has first call on materials. A large federal job in Eastern Washington involves an unstated quantity of steel for a large pipe line job. Specifications are not out but it is understood the larger sizes will go concrete and the smaller will likely be cast iron. For the Fort Lewis hospital improvement, Hugh G. Purcell, Seattle, has been awarded 340 tons of 16-inch pipe, for U. S. Pipe & Foundry Co., Burlington, N. J. Universal pipe awards total 375 tons to Marckmann & Williams, Seattle, for Central Foundry Co., New York. This includes 200 tons for various government jobs and 175 tons of 6-inch water line for King County District No. 7. Renton, Wash., has opened bids for 1785 feet of 8 and 12-inch supply pipe.

Fabricators have cleaned up their war agency contracts and are open for private business, which is of small proportions. Some plants have taken subcontracts but no major jobs are pending. Isaacson Iron Works is fabricating 1000 tons involved in a roof and ventilating system for the Reynolds Metal Co. aluminum plant at Longview, Wash.

Improved mill deliveries have eased the warehouse situation, which recently was critical. Railroads are facilitating shipments, which as a rule are sold prior to arrival. Consequently it is impossible to accumulate stocks. Local houses report record volume of business in June.

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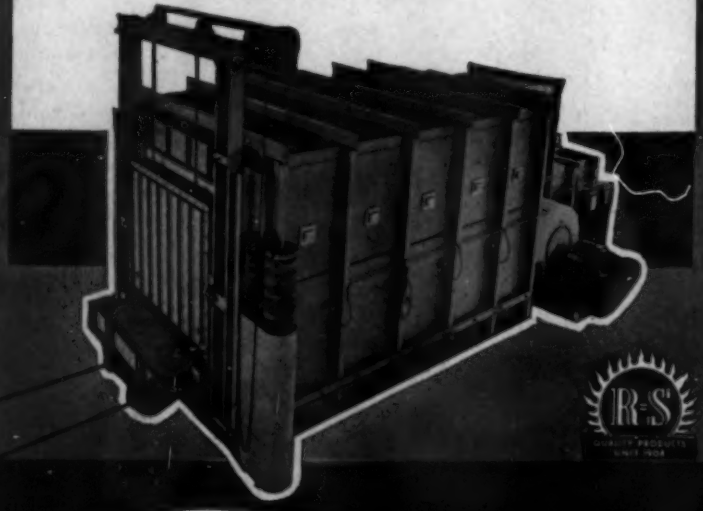


R-S Furnaces of Distinction

BUY WAR BONDS

Pacific Huts Inc., Seattle, a new firm which is manufacturing tunnel-shaped houses for the army and navy, using plywood and other lumber, emphasizes the saving in steel in its process. Each unit involves 900 pounds of steel clamps and fittings whereas a complete steel shell would require 9300 pounds of steel. The huts are being produced at the rate of one every ten minutes. Each month, it is claimed, in this plant wood takes the place of 4500 tons of steel.

Metallurgical Coke . . .

Coke Prices, Page 141

War Production Board officials are discussing possibility of getting priorities on coal for steel and other war activities. Because of the recent strikes coal stocks are small and railroad car supply is below needs and there is the possibility of further strikers. However, no definite action has been taken.

Nonferrous Metals . . .

Nonferrous Prices, Page 145

New York—Allocations of copper for September will be made this week. Allotments are closely hinged to scrap holdings which on some grades are relatively high, supplemented by war scrap from combat and training areas. Heavier operations on scrap metal and copper-base alloys is desirable where possible and distribution of new copper increasingly takes into consideration the scrap factor.

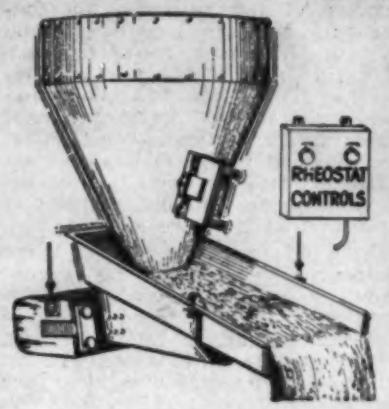
Claimant agency requests for copper for fourth quarter were reduced to balance with supply and the maintenance of reserves; the cut, however, was less than for the third quarter due in part to more conservative estimates. Manpower is a mounting problem, contributing to the tight position of the entire industry.

Demand for copper in war materials is maintained, but revised programs growing out of changes in equipment, may have an effect on individual consumers as will the heavier use of scrap. Conservation of copper by utilities is notable; the telephone companies will use only about 7000 tons this year against 100,000 tons in 1941. The telephone industry will contribute more to the stockpile than the tonnage of new copper used, or around 10,000 tons.

A program to redistribute idle copper tubing now in the possession of water utilities having inventories in excess of practical working minimums, as defined in Utilities Order U-1 has been announced by the War Production Board. It is expected that some 2½ million pounds will be recovered for war uses. For material purchased remelting or reprocessing, Copper Recovery Corp. will pay the following prices: tubing under ¾-inch diameter, 24.00c a pound; tubing ¾-inch and over, 18.00c a pound; both prices are f.o.b. point of shipment.

Users of zinc are conservative in asking for metal; scrap supplies are heavier and while August distribution is accounting for most prime western production, high grade tonnage continues to go into stockpile. Zinc concentrate output is adversely affected by labor shortages.

Covering on lead for September is heavier; the period for monthly allocations of lead from MRC has been moved forward a week to facilitate moving metal from Mexico and other longer transportation points. Consumers will now file on the 12th of each month for material wanted the following month.



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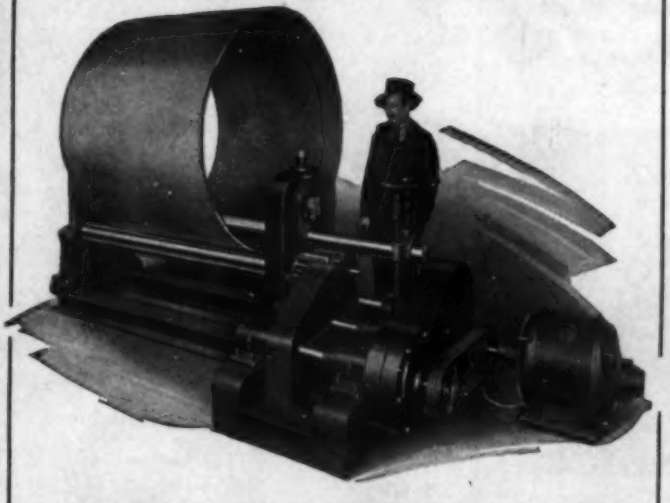

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ODT Given 1,380,000 Tons of Steel For Needed Freight Car Building

Recent release covered many orders frozen for months. . . . Shape, bar shortage may delay construction. . . New rail tonnage brings year's total above 1942

Recent action by Washington in freeing construction on a number of freight cars for domestic lines exceeded expectations of most sellers of car steel, although there had been a growing appreciation in Washington for some time of the desirability of providing railroads with more equipment to handle the volume of traffic which has arisen as a result of the war; however, many sellers of car steel did not look for the release of any additional work for third quarter, such as was indicated in the Aug. 9 issue of STEEL, page 53.

For one thing, most of the 20,000-car program, originally scheduled for completion in first half, fell for construction in the current quarter, a little less than 17,000 cars; for another, the shortage of steel at this time was regarded as too acute for undertaking anything further before late in the year. Some sellers of car steel were even far from sure that steel would be released so that car builders could at least begin work on an estimated program of 10,000 cars late in fourth quarter.

The third quarter program of about 5600 cars announced in last week's issue was composed largely of long-standing orders which had been frozen, in some instances as far back as March, 1942. Since the list of orders was first announced last week a few revisions have been made. The list of 502 box cars noted as going to American Car & Foundry Co., New York, is for the Chicago & Northwestern and not the Chicago, Milwaukee & St. Paul. The list of 400 fifty-ton box cars reported as going to Pullman-Standard Car Mfg. Co. for the Atlantic Coast Line should be revised to 350 hopper cars for the Louisville & Nashville. These cars will be constructed in the company's Bessemer, Ala., shops. Another item of 200 fifty-ton box cars for the Georgia Railway for construction in the same shops now calls for 225. Reference was also made to the Huntington Car & Foundry Co. This should have been the Huntington, Ind., shops of the American Car & Foundry Co.; likewise reference to the St. Louis Car Co. should have been the St. Louis shops of the American Car & Foundry Co.

In addition to these cars, the War Production Board has allocated the necessary steel in fourth quarter for construction of 9500 freight cars for domestic carriers. So as to conserve steel, the equipment will be built of composite material as far as possible. Also special car parts, such as ends and the like, which have been on hand at certain car shops for some time, but frozen, will be utilized as much as possible.

Some trade interests are still mystified as to where such steel as is necessary will come from, in view of the sold-up condition of mills. Most producers are now booked farther ahead, with firm, definite commitments than they have been in a long while. It is suggested in some quarters, however, that the "Share-the-Steel" drive may have made possible the supply of some of this steel for the new programs.

Although the new third quarter car program, as originally conceived, stipulated that delivery should be made on 75 per cent of the cars during third quarter, the remainder to be completed in the fourth quarter, car builders seriously doubt if many of these cars will be delivered this period. Sufficient plates (strip mill plates) will be available, they declare, but not shapes and bars. Some trade interests, in fact, believe that only a small portion of the program will be completed during third quarter.

Meanwhile, inquiries are now beginning to appear for cars to be built of steel allocated for shipment beginning in fourth quarter. The Nickel Plate, noted in last week's issue, as being in the market, is asking bids on 1075 freight cars; the Baltimore & Ohio, 1000 to 2000; the Chesapeake & Ohio, 200; and the Pere Marquette, 225, for a total of 3000 cars. The Erie also has a list pend-

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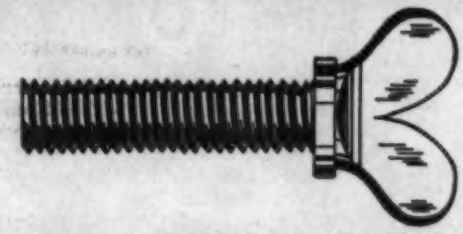

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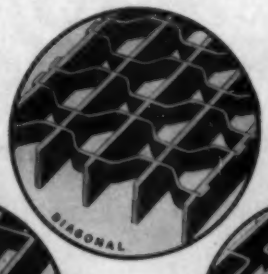

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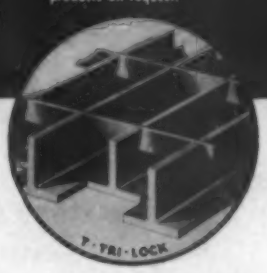

DRAVO CORPORATION
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ing, as recently noted, 800 cars. The Missouri, Kansas & Texas contemplates the purchase of 300 cars.

So far as can be learned, there has been no definite approval by Washington of the lists, as they now stand. Rather, present inquiries are more for the purpose of obtaining costs and estimates as to material required, all for submission later on for approval of WPB. Meanwhile, Office of Defense Transportation has announced that domestic carriers will receive 1,380,000 tons of carbon steel in fourth quarter against 1,200,000 tons in the current quarter. ODT had asked for 1,590,000 tons of carbon steel for fourth quarter.

The railroads, it is also announced, will receive 400,000 tons of replacement rail, 240,000 tons of track accessories and 300,000 tons of other maintenance materials, bringing the amount of new replacement rail for the entire year to 1,520,000 tons, as against 1,300,000 tons in 1942.

The war department is figuring on a large number of freight cars for next year's delivery, most being of 20 tons capacity. A much smaller, but still very sizable list is being figured for construction in fourth quarter for shipment to Russia under lend-lease.

Office of Defense Transportation has announced it has found it possible to provide for construction of an additional 5801 freight cars from steel allocated to the railroad industry for third quarter. This will include 2724 box cars, 262 gondolas, 2150 hoppers, 300 refrigerators and 365 flat cars. These cars will be divided among the following builders:

American Car & Foundry, 1402; Bethlehem Steel, 500; Fruit Growers Express, 300; General American Tank Car Co., 1100; Greenville Steel Car Co., 165; Mather Stock Car Co., 62; Mount Vernon Car Mfg. Co., 200; Pullman-Standard Car Mfg. Co., 1092; Chicago, Milwaukee, St. Paul & Pacific shops, 300; Chicago, Burlington & Quincy shops, 330; Reading Shops, 200; and St. Louis Southwestern shops, 150.

Tin Plate . . .

Tin Plate Prices, Page 141

Fourth quarter production schedules are tentatively set at 550,000 tons, or 55 per cent of capacity. This compares with scarcely more than 20 per cent in fourth quarter last year, and 70 per cent in the current quarter.

Tin plate industry advisory committee is pressing the War Production Board to provide steel to enable the industry to equalize output over the first three quarters next year. During periods of low operations, workers go into other jobs.

Last active producer of tin plate on the old hand-operated hot mills, the Washington Tin Plate Co., Washington, Pa., has advised WPB it will close Sept. 1. Restrictions on use of heavy-coated tin plate and advances in production of cold-reduced and electrolytic types were cited as the reason.

STRUCTURAL SHAPES . . .

SHAPE CONTRACTS PLACED

2300 tons, hangar, Goodyear Rubber Co., Akron, O., to American Bridge Co., New York.

1,000 tons, roof and ventilating system for Reynolds Metal Co. plant at Longview Wash., to Isaacson Works, Seattle.

PIPE . . .

CAST PIPE PLACED

340 tons, 16-inch, Fort Lewis, Wash., hospital project, to Hugh G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J.

200 tons, universal government projects Washington state, to Marckmann & Williams, Seattle, for Central Foundry Co., New York

175 tons, 6-inch universal, for King County District No. 7, to Marckmann & Williams Seattle, for Central Foundry Co., New York.

RAILS CARS . . .

FREIGHT CARS PLACED

Great Lakes Steel Corp., 30 seventy-ton gondolas, to the Pressed Steel Car Co., Pittsburgh.

Timken Roller Bearing Co., 25 seventy-ton gondolas, to American Car & Foundry Co., New York.

FREIGHT CARS PENDING

Erie, 800 cars, all hoppers it is understood; pending.

Nickel Plate, 1075, comprising 500 hopper, 500 composite box, 50 drop end gondolas and 25 covered hopper cars; pending.

Pere Marquette, 225, comprising 100 seventy-ton flat cars, 100 seventy-ton gondolas and 25 covered cars; pending.

Chesapeake & Ohio, 200, comprising 125 fifty-ton drop-end gondolas and 75 fifty-ton flats; bids asked.

Baltimore & Ohio, 1000 to 2000 hopper cars; pending.

Missouri, Kansas & Pacific, 300 box cars; contemplated.

LOCOMOTIVES PLACED

Chicago, Milwaukee, St. Paul & Pacific, ten 4-8-4 steam locomotives, reported placed with American Locomotive Co., New York.

Wheeling & Lake Erie, six 0-6-0 switch engines, to American Locomotive Co., New York.

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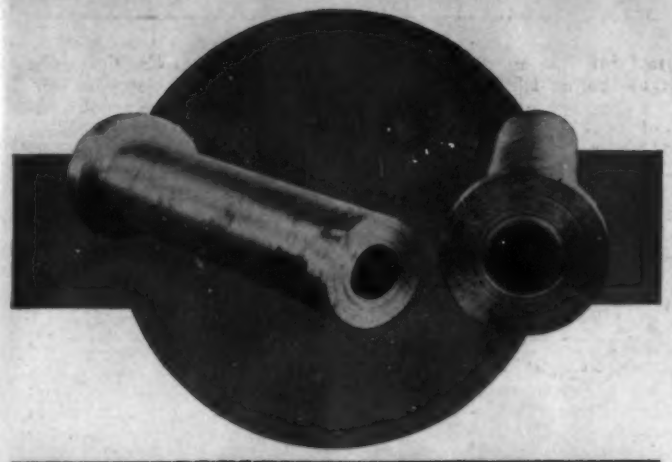

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Manpower Shift Planned To Ease Ball Bearing Bottleneck

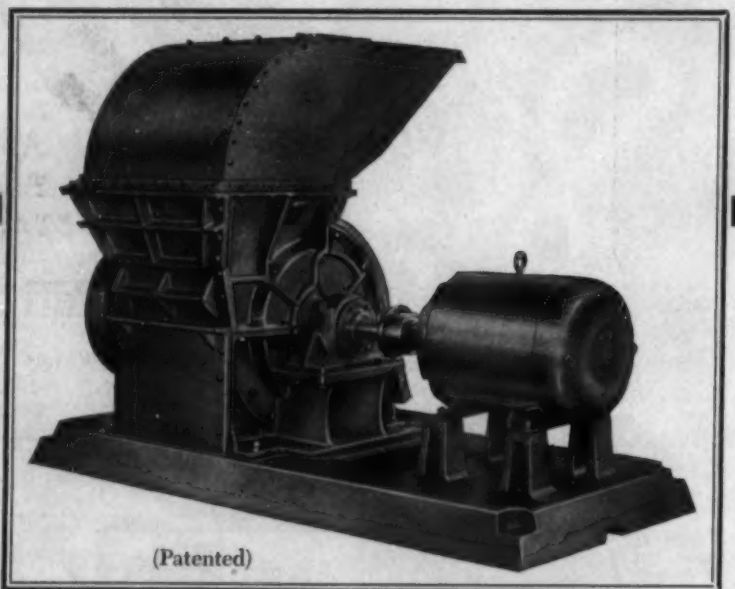
WPB asks release of workers to bearing makers. . . Backlogs at start of war increased by demand for mobile equipment. . . Steel shortage not important factor

Boston—For months efforts to break the bottleneck in ball bearings have been retarded by growing labor shortages rather than a serious lack of steel. To relieve the situation in Connecticut, manufacturers at New Britain, Bristol and Plainville have been asked by the War Production Board and War Manpower Commission to release 25 per cent of their skilled mechanics to ball bearing plants, indicating a mandatory order would follow unless the shift in machinists was made. The shortage in Connecticut is repeated in other areas and SKF Industries Inc. is seeking 1700 machinists for a plant at Lansdale, Pa.

Bearing plants were filled with orders at the start of the defense program and have never been able to make much progress in easing the situation, with orders piling in for mobile war equipment, gun-control mechanisms, aircraft and scores of other units in which friction must be kept to a minimum. The cutback in the tank program helped and some tank firms are now making bearings as part of their production. Subcontracting has been expanded, some plant expansions authorized and production schedules stepped up, but the demand, notably for aircraft, has climbed higher. Slackening of orders for machine tools has been more than offset by heavier demand in other directions. During this period the labor shortage has been growing.

At times, on some sizes and grades, steel is tight, but for the most part the pinch has not been in bar stock; hot-rol' d high carbon-chromium alloy bars, largely in 52100 grade, electric furnace steel, is required in large quantities for many ball bearings. For larger sizes forging stock is used while tubing of similar grade is fabricated for stack bearings in aircraft propellers. Flat strip stock for shields and hardware in assemblies is frequently tighter than bars; of the steels required for bearing manufacture tubing is the tightest, cold-drawn especially.

The load carried by all bearing manufacturers is heavier than for other types and all sizes are involved, from .0039-inch used in aircraft instruments to steel mill bearings. In a single bomber 2000 control-pulley bearings are required, while requirements for gun mounts, gun carriages, electric motors and many types of control equipment are heavy. In the Plainville, Conn., area, cited for assistance in the way of manpower, are the New Departure Division and Marlin Rockwell Corp.; other manufacturers of bearings may be included in the program for manpower aid.



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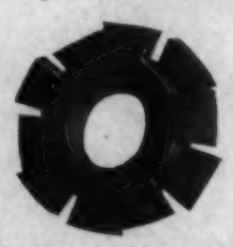

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Warner & Swasey Busy On Subcontract Work

Warner & Swasey Co., Cleveland, is acting as subcontractor for 20 companies engaged in manufacture of war materiel and is producing parts for a wide variety of weapons and equipment.

The company is now turning out parts for airplane engines, submarines, diesel engines, power plants for destroyers, torpedoes, jacks for bomb loading, chemical bombs, gun turrets, electric hoists for cargo ships, and motors for lend-lease.

Types of parts manufactured include drive shaft bearings, valves, oil retainers, armature discs, throttling gears, locking pins, poppets, spring holders, blower end plates, cylinder heads, blower housing, bushings, engine blocks, steel cones, pistons, steel cores, hub caps, jacks, seal rings, rotors and spindles.

By subcontract work of this type the company expects to maintain continuous operation for the duration of the war.

Steel in Europe . . .

London — (*By Radio*) — Semifinished steel supply position in Great Britain is much improved and rerollers are well supplied, with contracts covering the next three months. Plate mills are fully booked to the end of the year. The situation in sheets is easier. Scrap supply is adequate for all needs.

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BEALL Spring Washers compensate for wear, bolt-stretch, corrosion and break-down of finish. They meet rigid Army, Navy and Air Corps specifications. Available in Carbon Steel, Stainless Steel, Phosphor Bronze, Everdur and Monel Metal. Finished in Cadmium Plate, Galvanized, Silver and Parkerized. IMMEDIATE SHIPMENT of all standard sizes.

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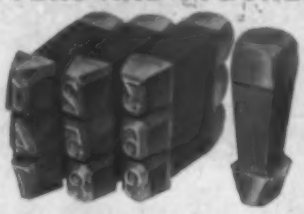

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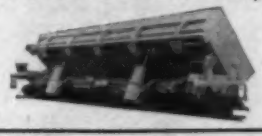

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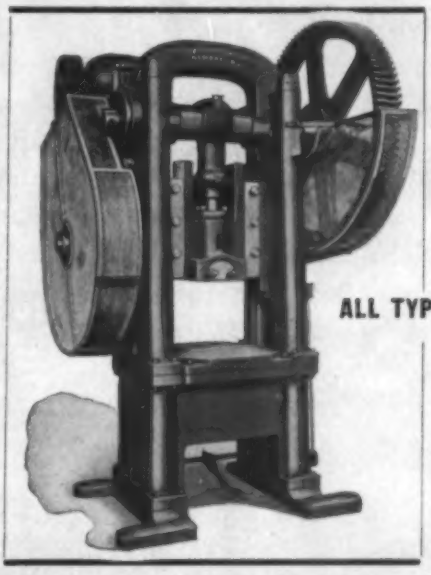

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CONSTRUCTION AND ENTERPRISE

OHIO

CLEVELAND—Air Maze Corp., Albert E. Schaaf, president, Oliver H. Schaaf, vice president and general manager, plans a one-story 90 x 180-foot top addition to its plant at 5200 Harvard avenue, Newburg heights, at cost of $40,000.

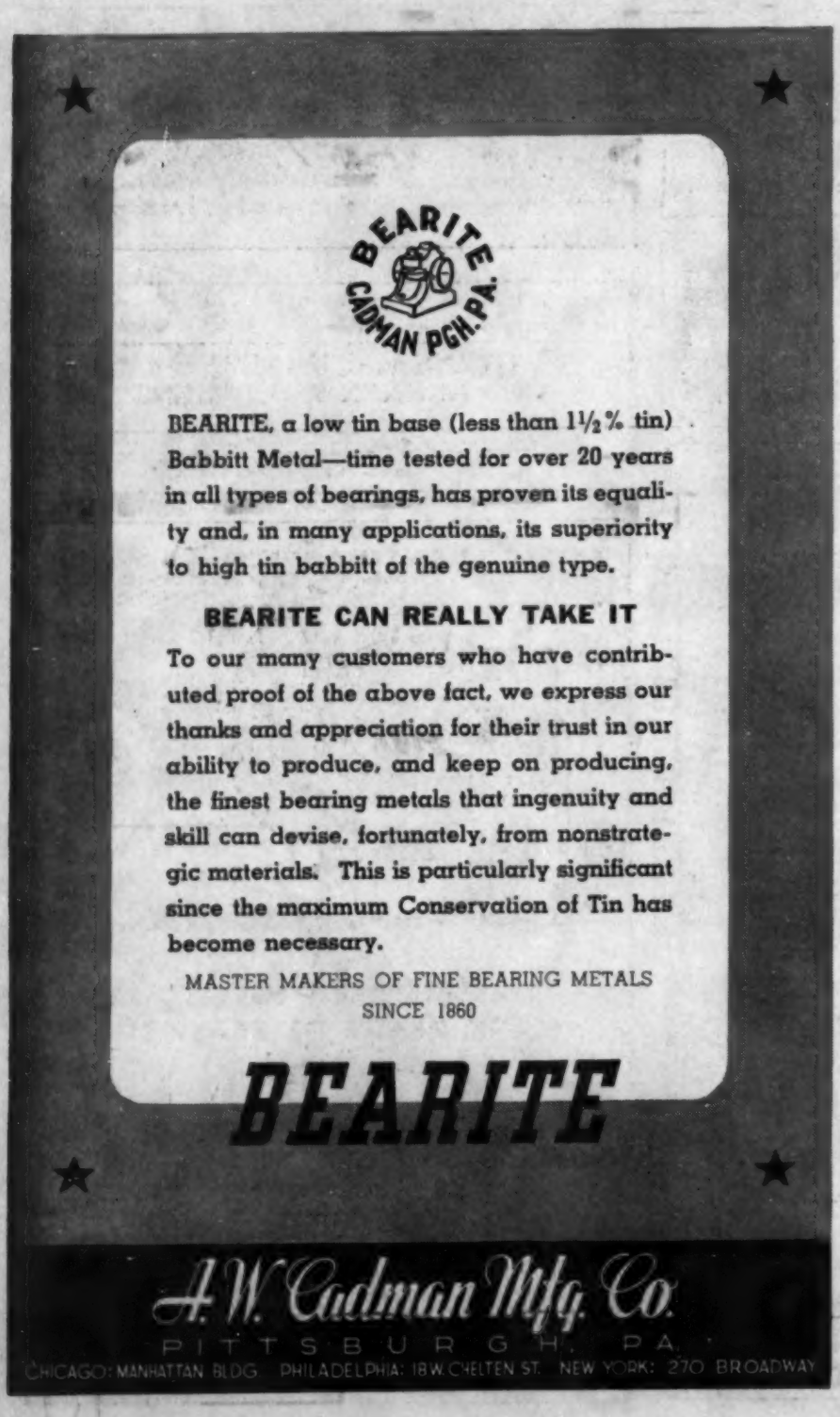
CLEVELAND—White Motor Co., Robert Black, president, 842 East Seventy-ninth street, will build an incinerator 20 x 20 and 20 x 32 feet, to cost about $7500.

CLEVELAND—Pressure Castings Co., G. Rolls, president, has let contract to A. M. Higley Co., 2036 Twenty-second street, for one-story foundry and warehouse buildings, 60 x 200 and 24 x 135 feet, to cost about $75,000.

CLEVELAND—Gent Machine Co., 445 Green road, South Euclid, Arthur Gent, president, plans a one-story office building, 22 x 37 feet, to cost about $7500.

CLEVELAND—Boom Boiler & Welding Co., Center and Hemlock streets, W. B. Boom, president, is having plans prepared for a one-story office building, 28 x 40 feet.

ELYRIA, O.—American Brake Shoe Co., William B. Given Jr., president, 230 Park avenue, New York, plans extensions to double plant of Electro Alloys Co., which it has acquired and will operate as a subsidiary. W. C. Whyte is vice president of Electro Alloys Co.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To our many customers who have contributed proof of the above fact, we express our thanks and appreciation for their trust in our ability to produce, and keep on producing, the finest bearing metals that ingenuity and skill can devise, fortunately, from nonstrategic materials. This is particularly significant since the maximum Conservation of Tin has become necessary.
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CHICAGO: MANHATTAN BLDG. PHILADELPHIA: 18 W. CHELTEN ST. NEW YORK: 270 BROADWAY

MASSILLON, O.—Canton Drop Forging & Mfg. Co., C. A. Blaughler, president, will let contract soon through Ernest McGeorge and W. R. Hargett, architects, 9400 Quincy avenue, Cleveland, for rebuilding its aluminum forging mill, including one building 1000 feet long and a three-story office building. Cost is estimated at about $750,000.

NEWARK, O.—City of Newark, S. A. Anderson, service director, C. H. Wells, city engineer, plans subways under Baltimore & Ohio and Pennsylvania railroad tracks and is having engineering plans made. Priorities have been granted.

YOUNGSTOWN, O. — Valley Engineering Corp. has been incorporated to manufacture machine parts by Arthur N. Peterson and associates. Marvin Traxler, 407 Dollar Bank building, is handling details.

MASSACHUSETTS

MALDEN, MASS.—Converse Rubber Co., 392 Pearl street, will let contract soon for a one-story plant addition 80 x 85 feet. A. Rosenstein, 120 Milk street, Boston, is architect.

WORCESTER, MASS.—Coates Clipper & Mfg. Co., 237 Chandler street, has let contract to J. B. Lowell Inc., 173 Grove street, at about $40,000, for a two-story 50 x 65-foot plant addition.

CONNECTICUT

STRATFORD, CONN.—William H. Shea, town manager, Town Hall, plans extensions to its incinerator plant, to cost about $300,000. Application has been made for FWA funds. M. J. Jankowski is town engineer.

NEW JERSEY

BAYONNE, N. J.—General Cable Corp., 243 West First street, is having plans prepared for a storage and manufacturing building for locker and reclaiming departments.

BLOOMFIELD, N. J.—Westinghouse Electric & Mfg. Co., Maloney building, Allies boulevard, Pittsburgh, has let contract to Frank Briscoe, 2875 South Nineteenth street, Newark, N. J., for a two-story plant addition 16 x 104 feet, to cost about $50,000.

CLIFTON, N. J.—Hoffman-La Roche Co., Kingsland road, Nutley, N. J., has let contract to White Construction Co., 95 Madison avenue, New York, for a boilerhouse, to cost about $40,000.

ELIZABETH, N. J.—American Munitions Corp., division of American Type Founders Co., 200 Elmora avenue, is having plans prepared by Godfrey Poggi, 287 Morris avenue, for interior alterations to four-story and basement manufacturing building, to cost about $40,000.

PENNSYLVANIA

CREIGHTON, PA.—Pittsburgh Plate Glass Co., M. E. Carlisle, purchasing agent, Grant building, Pittsburgh, has let contract to Groomes Construction Co., Box 133, Springdale, Pa., for a one-story assembly building 100 x 250 feet. R. D. Bole, Grant building, Pittsburgh, is chief engineer.

MICHIGAN

DEARBORN, MICH.—City clerk has been authorized to call for bids on a $150,000 sewage sludge incinerator addition at the west side disposal plant. Plans have been approved by the city council.

DETROIT—City Pattern Works Inc., 1161 Harper avenue, has been incorporated with $1000 capital to conduct a general foundry business.

DETROIT—Parkside Engineering & Tool Mfg. Co., 1958 East Seven-mile road, has been incorporated with $25,000 capital to manufacture airplane parts, by William B. Stevenson, 1044 Eastlawn avenue.

DETROIT—Thermex Equipment Co., 3437 Book building, has been incorporated with $25,000 capital to manufacture metal, wood and glass products, by Charles H. Miller,

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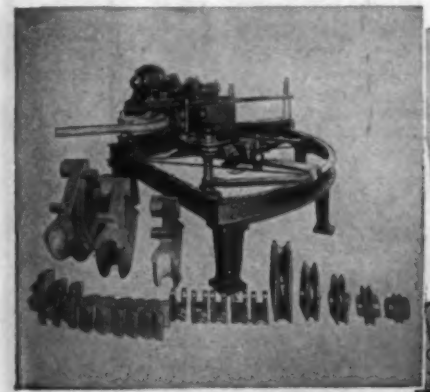

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17 PEARL ST.

BOSTON, MASS.

7240 St. Paul avenue.

DETROIT—Continental Corp., 2901 East Jefferson avenue, has let contract to Campbell Construction Co., 3255 Coldner avenue, for a one-story plant addition 130 x 270 feet, to cost about $40,000.

ILLINOIS

CHICAGO—H. M. Harper Co., 2620 West Fletcher street, manufacturer of nonferrous bolts and nuts is building its fourth plant addition since June, 1940.

CHICAGO—Apex Smelting Co., 2537 West Taylor street, has bought a detached site west of its property for new facilities for magnesium ingot production.

CHICAGO—Chicago Gear Mfg. Co., 2823 West Fulton street, is adding to its manufacturing facilities.

CHICAGO—Wisconsin Steel Works of International Harvester Co., 2701 East 106th street, plans an additional laboratory building at its main plant.

CHICAGO—American Gear & Mfg. Co., 6645 West Sixty-fifth street, has bought the Henry Lindahl Foundry & Machine Co., 5900 Ogden avenue, Cicero, Ill., and will continue it in operation. Property includes 330,000 square feet of land, three-story foundry building, two-story machine shop and one-story pattern shop.

CICERO, ILL.—Abart Gear & Machine Co., 4820 West Sixteenth street, is making additions to its production facilities.

CHICAGO—American Brake Shoe Co., 1220 West 119th street, has expanded heat treating facilities at its Great Lakes plant.

CHICAGO—Logan Engineering Co., 4901 West Lawrence avenue, is making substantial additions to its manufacturing facilities.

LOMBARD, ILL.—Franklin-McAllister Corp., Rockdale, Ill., has established a branch manufacturing plant here to serve manufactured parts and accessories to the Howard Aircraft Co., St. Charles, Ill.

MELROSE PARK, ILL.—Buick Aviation division General Motors Corp., North avenue and LaGrange road, is building its second major expansion for production of aircraft engines. Production schedule now is nine times the original commitment.

NORTH CHICAGO, ILL.—Tantalum Corp., subsidiary of Fansteel Metallurgical Corp., has received approval from DPC for a substantial addition to its recently completed plant.

INDIANA

CAMBRIDGE CITY, IND.—Converto Mfg. Co., Charles Golay, president, is rebuilding three one-story machine shop buildings, each 60 x 125 feet, estimated to cost about $80,000, with equipment.

EVANSVILLE, IND.—Southern Indiana Gas & Electric Co. plans to build a 20,000 kilo unit transmission line, to cost $100,000, including equipment.

FORT WAYNE, IND.—City, James R. Hardendorf, resident engineer, city hall, will take bids soon on sale of power plant equipment, including 3000-kw turbine and auxiliary equipment, generator, condenser, pumps, control panel oil circuit breaker, field rheostat, transformers, switches and 60 feet of 20-inch cast iron flanged pipe.

LEBANON, IND.—U. S. Machine Corp. has expanded its Winkler Stoker division by taking over a three-story manufacturing plant. This purchase, with a recent addition to the main plant, which houses the airplane parts division, adds 100,000 square feet of factory space. Al H. Wynkoop is public relations director.

WABASH, IND.—Container Corp. of America, 111 West Washington street, Chicago, has plans by M. S. Carstens, 1 North LaSalle street, Chicago, for alterations to plant, including electric wiring and other equipment.

LOUISIANA

NEW ORLEANS—Lorne Plumbing & Heating Co., Detroit, has been awarded contract for boilerhouse piping at plant of Higgins Aircraft Corp.

ARKANSAS

PINE BLUFF, ARK.—Arkansas Power & Light Co., Pine Bluff, is having plans prepared for rebuilding and rerouting basic power lines in the Batesville, Ark., area and reconstructing power lines at Guion, Ark.

WISCONSIN

JANESVILLE, WIS.—Parker Pen Co., 210 Court street, is having plans drawn by S. L. Reily, 300 West Adams street, Chicago, for a one-story building 90 x 380 feet. E. A. Krehbiel, 222 West Adams street, Chicago, is engineer.

WAUSAU, WIS.—Marathon Battery Co., 840 Henrietta street, is having plans made for a one-story factory addition 100 x 100 feet.

ARIZONA

PHOENIX, ARIZ.—Goodyear Aircraft Corp. has let contract for an aircraft modification building at Litchfield Park, Ariz., including laboratories, shop and offices, 200 x 250 feet. Steel will be furnished and erected by Bethlehem Steel Co.

CALIFORNIA

BIG PINE, CALIF.—U. S. Tungsten Co. will build a 50-ton tungsten mill on property it has leased near here. Tom Vignich will be superintendent. Ore will be mined five miles west of Big Pine.

LOS ANGELES—Century Metalcraft Co., 659 East Sixtieth street, has let contract to Ted R. Cooper Co., 1021 South Broadway, for a factory building 188 x 200 feet, to cost about $70,000.

LOS ANGELES—American Aviation Co. has been incorporated with $200,000 capital, by Frank J. Mackin, 4446 Ambrose avenue, and associates.

LOS ANGELES—California Aircraft Engineering Co. has been incorporated with $25,000 capital and is represented by Charles W. Hollinson, 1000 Lincoln building.

LOS ANGELES—Air Cargo Inc., 233 Broadway, New York, has been incorporated with 1000 shares no par value stock. Joseph C. Cannon, Security building, Los Angeles, is California agent.

LOS ANGELES—Century Metalcraft Corp. will build a one-story factory building, 188 x 200 feet, at 659 East Sixtieth street, at cost of about $70,000.

LOS ANGELES—Precision Screw Products Co., 5202 Alhambra avenue, will build a factory building 40 x 85 feet at 4766 Valley boulevard, to cost about $8500.

OREGON

ALBANY, OREG.—Fire destroyed the local cannery, which was newly equipped last year, with loss of $20,000.

PORTLAND, OREG.—Reimers & Jolivette, Portland, have been given a contract for a timber warehouse 100 x 200 feet at the St. Johns plant of Oregon Shipbuilding Co.

TOLEDO, OREG.—City officials have recommended completion of the municipal power plant, rejecting a proposal to join a public utility district with Lane, Coos and Douglas counties.

WASHINGTON

SEATTLE—Port of Seattle has called bids for August 23 for construction of two transit sheds, one-story, 110 x 980 feet, plans by George T. Treadwell, engineer. Cost estimated at $700,000.

BELLINGHAM, WASH.—Reid Boiler Works Inc. has been incorporated with $50,000 capital, by R. E. Reid and associates.

SEATTLE—Boeing Aircraft Co. has awarded contract to Henrik Vallee & Co. for construction of a two-story addition 22 x 168 feet to the plant office building.

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Direct from Manufacturer

One—Southwark Hydraulic Blanking Press, 500 ton, line.
One—Etna Rotary Swager, 3" diam. x 6", M.D.
Three—7½" x 27" Libby Type C Turret Lathes, M.D.
One—5⅛" x 28" Foster Type 3B Turret Lathe, M.D.
Two—4¼" x 22" Libby Type B Turret Lathes, M.D.
One—7½" x 35" Gisholt Type K Turret Lathe, M.D.

Write Box 969
STEEL, Penton Bldg., Cleveland 13, O.

FOR SALE

1 — 40" x 50" x 13" dia. Herman Pneumatic Jarring Machine Serial #2825.
1 — 48" x 72" x 20" dia. Herman Pneumatic Jarring Machine Serial #3130.
1 — 48" Cupola Overall Height 55 ft., 6 tuyeres, 5" dia.
1 — Mogul Metallizer Unit #M-160-B complete.

VULCAN MOLD & IRON COMPANY
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357 h.p. Heine box header straight tube, excellent condition 150 pounds pressure permitted including engine driven Riley four retort rear dump stoker and fan.

QUEEN CITY WAREHOUSE CO.
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Boring Mills: 36", 42", 54", 60", 10'
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Lathe: 24" x 12' Boye & Emmes
Lathe: Niles 48" x 26'
Punch, Peles 6' Throat, 1¼" through 1"
Turret Lathe, 24" Gisholt, 6¼" hole
Turret Lathes: 21", 28" Gisholt

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BORING MILL, 84" N-B-P, R.P.T., M.D.
BORING MILL, 42" Bullard, 2 heads, M.D.
DRILL, Radial 3-1/2' Cincinnati-Bickford, M.D.
GEAR PLANERS, Bevel 36" & 54" Gleason, M.D.
HAMMER, Steam Forging 1100 lb. N-B-P.
SHEARS, Plate 44" & 54" x 3/16" M.D.
SHEAR, angles No. 4 Cleve. 6"x6"x1", M.D.
STRAIGHTENER, Wire Shuster, cap. 5/8".
STRAIGHTENER, Tube Torrington 1/4"-5/8" O.D.
STRAIGHTENER, Plate 12-roll H&J, 54" x 1/4".
TURRET LATHE, 24" Gisholt, H.S.-1/4", M.D.
TURRET LATHE, 26" Libby, H.S. 7-1/2", S.P.D.

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ACCOUNTANT, AGE 43. 18 YEARS EXPERience as chief accountant and office manager of well known manufacturing concern. Thoroughly familiar with all phases of manufacturing and cost accounting. Seeks position with postwar future with large concern, preferably in Southeast. Best references. Reply Box 979, STEEL, Penton Bldg., Cleveland 13.

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of Strip Cold Rolling Equipment and Wire Mill Machinery has opening for a man experienced in the processing and cold rolling of narrow strips and wire drawing. Should be able to make outside contacts regarding equipment requirements for post-war period.

If employed now in essential war job and not available immediately, change could be deferred until a later date.

Applicants please give full details as to past experience and ability in the sales engineering field.

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STRUCTURAL STEEL DESIGNER

For large southern fabricating plant, experienced in riveted and welded design. Must be capable of developing new designs and have cooperative spirit. State salary expected and give three references.

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HELP WANTED

EXPERIENCED PLATE SHOP SUPERINTENDENT for large southern plant. Prefer man with engineering education capable of handling men. Give references and salary expected with application.

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MECHANICAL ENGINEER WANTED

Experience in wire drawing machinery desirable. Must be capable of assuming full charge of plant equipment development program in cooperation with operating organization. In reply give all essential facts required for prompt action. Reply Box 971, STEEL, Penton Bldg., Cleveland 13, Ohio.

LAYEROUT WANTED FOR LIGHT AND heavy plate fabricating shop located in Northeastern State. Steady position also after the duration. State previous experience, age and salary or wages required. Reply Box 960, STEEL, Penton Bldg., Cleveland.

WANTED: MAN WITH GENERAL OFFICE or field sales experience by large reputable manufacturer of seamless and electric welded tubing, alloy and carbon steels. Please apply giving full information, experience, etc., to Box 894, STEEL, Penton Bldg., Cleveland.

WANTED: MECHANICAL ENGINEER with Pipe Mill experience. Eastern Location. Excellent opportunity for man of experience and ability. Mature age no barrier if the man is right for the job. Give full details of experience to Box 976, STEEL, Penton Bldg., Cleveland 13.

YOUNG OR MIDDLE AGE MAN, TECHNICAL training preferred, capable of introducing speed and efficiency in medium size machine shop with large and small machine tools. Permanent position if you can produce results. Reply Box 968, STEEL, Penton Bldg., Cleveland.

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Pressed Steel Louver Panels and Cover Plates

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IF YOU'RE MAKING MORE MONEY

...WATCH OUT!

WE WANT TO WARN YOU, before you read this page, that you've got to use your head to understand it.

We also want to warn you that—if you don't bother to read it carefully enough to understand it—you may wake up after this war as poor as a church mouse.

• • •

This year Americans are going to make —minus taxes—125 billion dollars.

But this year, we civilians are not going to have 125 billion dollars' worth of goods to spend this on. We're only going to have 80 billion dollars' worth. The rest of our goods are being used to fight the war.

That leaves 45 billion dollars' worth of money burning in our jeans.

Well, we can do 2 things with this 45 billion dollars. One will make us all poor after the war. The other way will make us decently prosperous.

This way the 45 billion dollars will make us poor

If each of us should take his share of this 45 billion dollars (which averages approximately $330 per person) and hustle out to buy all he could with it—what would happen is what happens at an auction where every farmer there wants a horse that's up for sale.

If we tried to buy all we wanted, we would bid the prices of things up and up and up. Instead of paying $10 for a dress we're going to pay $15. Instead of $5 for a pair of shoes we're going to pay $8.

This bidding for scarce goods is going to raise prices faster than wages. Wages just won't keep up.

So what will people do?

U. S. workers will ask for more money. Since labor is scarce, a lot of them will get it. Then farmers and business men who

feel the pinch are going to ask more money for their goods.

And prices will go *still higher*. And the majority of us will be in that same old spot again—only worse.

This is what is known as Inflation.

Our government is doing a lot of things to keep prices down . . . rationing the scarcest goods, putting ceiling prices on things, stabilizing wages, increasing taxes.

But the government can't do the *whole job*. So let's see what *we* can do about it.

This way the 45 billion dollars will make us prosperous

If, instead of running out with our extra dough, and trying to bid on everything in sight, we buy only what we absolutely need, we will come out all right.

If, for instance, we put this money into (1) Taxes; (2) War Bonds; (3) Paying off old debts; (4) Life Insurance; and (5) The Bank, we don't bid up the prices of goods at all. And if besides doing this we (6) refuse to pay more than the ceiling prices; and (7) ask no more for what we have to sell—no more in wages, no more for goods—*prices stay where they are now.*

And we pile up a bank account. We have our family protected in case we die. We have War Bonds that'll make the down payment on a new house after the war, or help us retire some day. And we don't have taxes after the war that practically strangle us.

Maybe, doing this sounds as if it isn't fun. But being shot at up at the front isn't fun, either. You have a duty to those soldiers as well as to yourself. You *can't* let the money that's burning a hole in your pocket start setting the country on fire.

★ ★ ★

This advertisement, prepared by the War Advertising Council, is contributed by this Magazine in co-operation with the Magazine Publishers of America.

KEEP PRICES DOWN!

Use it up
Wear it out
Make it do
Or do without

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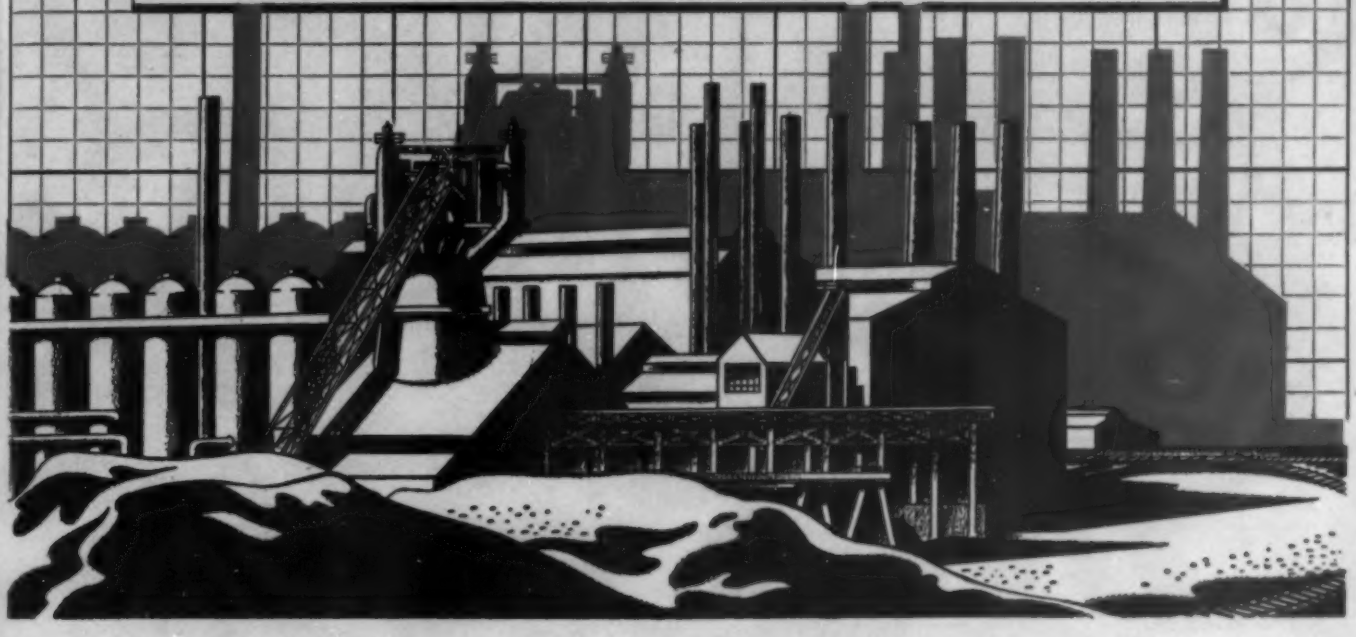

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